SOIL SURVEY OF

Montgomery County, Texas

United States Department of Agriculture
Soil Conservation Service and Forest Service
In cooperation with
Texas Agricultural Experiment Station

Issued October 1972

Major fieldwork for this soil survey was done in the period 1959–65. Soil names and descriptions were approved in 1967. Unless otherwise indicated, statements in this publication refer to conditions in the county in 1965. This survey was made cooperatively by the Soil Conservation Service and the Forest Service, United States Department of Agriculture, and the Texas Agricultural Experiment Station. It is part of the technical assistance furnished to the Montgomery-Walker Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, USDA, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms, ranches, and woodlands; in selecting sites for roads, ponds, buildings, and other structures; and in determining the suitability of tracts of land for farming, industry, and recreation.

Locating Soils

All the soils of Montgomery County are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with a number on the "Index to Map Sheets."

On each sheet of the detailed map, soil areas are outlined and are identified by symbols. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in this publication. This guide lists all the soils of the county in alphabetic order by map symbol. It shows the page where each soil is described, and gives the capability unit of each. It also gives the woodland suitability group, pastureland and hayland group, wildlife site, and woodland grazing group in which each soil has been placed.

Interpretations not included in the text can be developed by grouping the soils according to their suitability or limitation for a particular use. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with farmers can learn about use and management of the soils from the soil descriptions and from the discussion of the capability units, pasture and hay groups, woodland groups, and woodland grazing groups.

Foresters and others can refer to the section "Use of Soils for Woodland," where the soils of the county are grouped for both their suitability for trees and woodland pasture.

Game managers, sportsmen, and others can find information about soils and wildlife habitat in the section "Use of the Soils for Wildlife."

Engineers, builders, and community planners can find, under "Engineering Uses of Soils," tables that contain test data, estimates of soil properties related to engineering, and behavior of the soils when used for various engineering structures.

Scientists and others can read about how the soils formed and how they are classified in the sections "Geology" and "Formation and Classification of the Soils."

Newcomers to Montgomery County will be interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County."

Cover picture: Timber on Conroe loamy fine sand, 0 to 5 percent slopes. This soil is suitable for low-cost roads.

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SOIL SURVEY OF MONTGOMERY COUNTY, TEXAS

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UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE TEXAS AGRICULTURAL EXPERIMENT STATION

MONTGOMERY COUNTY is in the southeastern part of Texas, in the land resource area of the East Texas Timberlands, Texas Blackland Prairie, and the Gulf Coast Prairies. The county covers 697,000 acres. It is irregular in shape and is about 28 miles from north to south and 39 miles from east to west (fig. 1).

The northern and western parts of the county are undulating; the south and southeastern parts are level to gently sloping. The elevation ranges from 79 feet in the southern part of the county to 330 feet in the northwestern part.

About 84 percent of the county, or 584,600 acres, is in timber. Small areas have been cleared in the timbered area for cultivation. The Texas Blackland Prairie part of the county is mostly in pasture, but small areas are in corn and feed crops.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soil are in Montgomery County, where they are located,

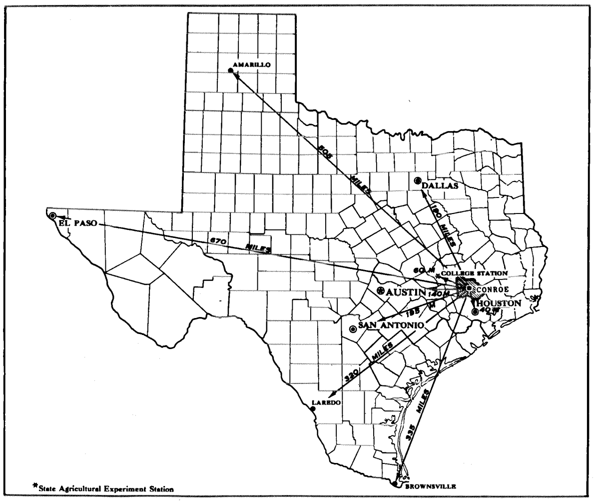


Figure 1.—**Location of Montgomery County in Texas.**

and how they can be used. The soil scientists went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. They observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; the kinds of rock; and many characteristics of the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by the action of plant roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. The *soil series* and the *soil phase* are the categories of soil classification most used in a local survey.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, all the soils of one series have major horizons that are similar in thickness, arrangement, and other important characteristics. Each soil series is named for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Conroe and Splendora, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the undisturbed landscape.

Soils of one series can differ in texture of the surface soil and in slope, stoniness, or some other characteristic that affects use of the soils by man. On the basis of such differences, a soil series is divided into phases. The name of a soil phase indicates a feature that affects management. For example, Wicksburg loamy fine sand, 1 to 5 percent slopes, is a phase within the Wicksburg series.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this publication was prepared from aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning the management of farms and fields, a mapping unit is nearly equivalent to a soil phase. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil phase.

Some mapping units are made up of soils of different series, or of different phases within one series. Two such kinds of mapping units are shown on the soil map of Montgomery County: soil complexes and undifferentiated groups.

A soil complex consists of areas of two or more soils, so intermingled or so small in size that they cannot be shown separately on the soil map. Each area of a complex contains some of each of the two or more dominant soils, and the pattern and relative proportions are about the same in all areas. The name of a soil complex consists of the names of the dominant soils, joined by a hyphen. Ferris-Gullied land complex, 3 to 8 percent slopes, is such a mapping unit in this county.

An undifferentiated group is made up of two or more soils that could be delineated individually but are shown as one unit because, for the purpose of the soil survey, there is little value in separating them. The pattern and proportion of soils are not uniform. An area shown on the map may be made up of only one of the dominant soils, or of two or more. Waller soils, ponded, is an undifferentiated group in this county.

In most areas surveyed there are places where the soil material is so rocky, so shallow, or so severely eroded that it cannot be classified by soil series. These places are shown on the soil map and are described in the survey, but they are called land types and are given descriptive names. Gullied land, the only land type in this county, is mapped with Ferris soil as Ferris-Gullied land complex, 3 to 8 percent slopes.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data from the same kinds of soil in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field or plot experiments on the same kinds of soil. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, delineated on the map, and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way as to be readily useful to different groups of users, among them farmers, managers of woodland, and engineers.

On the basis of yield and practice tables and other data, the soil scientists set up trial groups. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map at the back of this survey shows, in color, the soil associations in Montgomery County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different proportion and pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is a useful general guide in managing a watershed, a woodland tract, or a wildlife area, or in planning engineering works, recreational facilities, and community developments. It is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, content of gravel, drainage, and other characteristics that affect management.

The eight soil associations in Montgomery County are described in the following pages.

1. Conroe association

Deep, gently sloping to rolling, moderately well drained and well drained, sandy soils that have clayey lower layers

This association occupies broad, gently sloping tops and steeper sides of ridges (fig. 2). Drainage patterns are well defined. The soils are deep, acid loamy fine sands over brittle, mottled clays.

This association covers about 27 percent of the county. Conroe soils occupy about 51 percent of the association. Less extensive are the Blanton, Fuquay, and Robertsdale soils, which together account for 34 percent of the total acreage. Other minor soils make up 15 percent.

Conroe soils have a surface layer of brownish loamy fine sand containing ironstone gravel. The underlying material is mottled brown, red, yellow, and gray clay. Slopes range up to 12 percent.

Blanton soils are deep, somewhat excessively drained sands that occur in the higher parts of the association. Fuquay soils have less clay in the lower layers than the Conroe soils. The Robertsdale are level soils at the heads of natural drains. Other minor soils in this association are in the Albany, Boy, Gunter, Segno, and Sunsweet series.

This association is used mainly for timber, but small livestock farms are scattered through it. Housing developments are increasing in numbers. Ironstone gravel for construction is mined in places.

2. Splendora-Boy-Segno association

Deep, nearly level to gently sloping, somewhat poorly drained to well drained, loamy and sandy soils that have loamy lower layers

This association consists of broad, nearly level and gently sloping fine sandy loams and some low ridges of fine sand. (fig. 3).

This association covers about 22 percent of the county. Splendora soils make up about 25 percent of the association, Boy soils 20 percent, and Segno soils 14 percent. Less extensive but important are Sorter soils, which make up 10 percent of the association. Minor soils make up 31 percent.

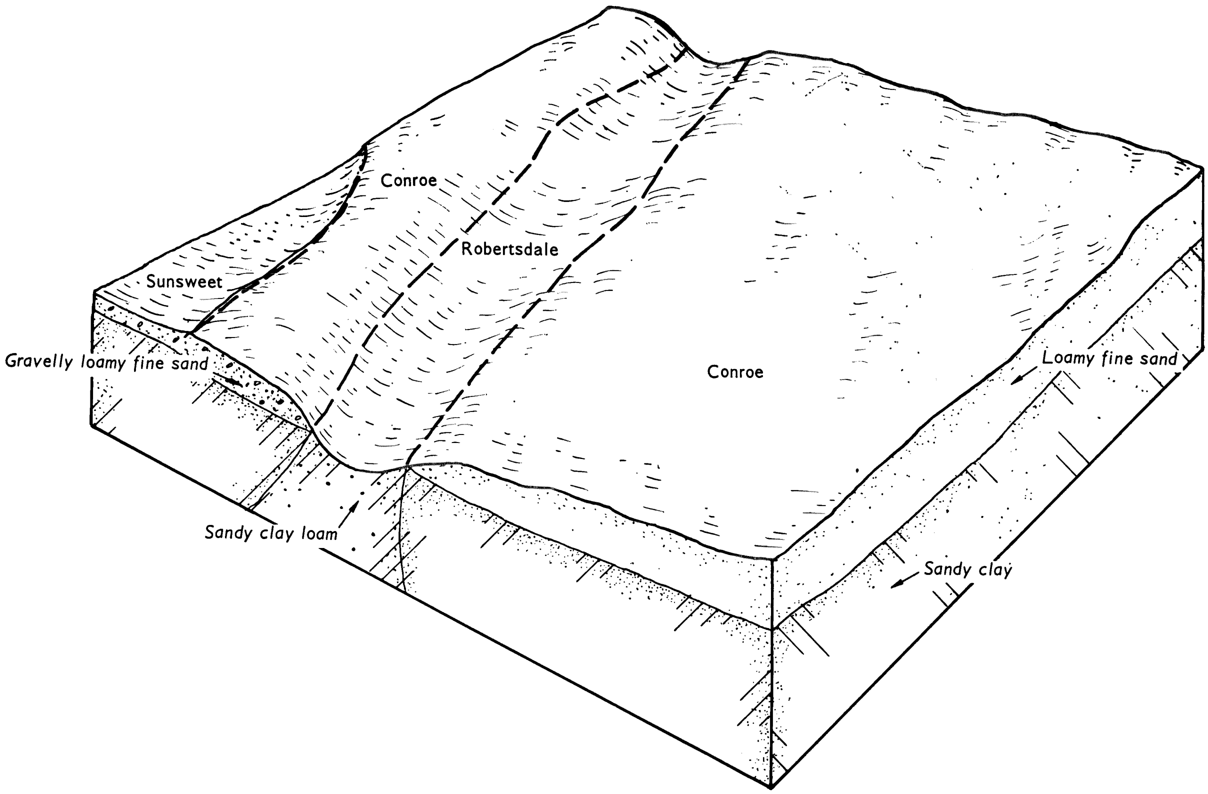


Figure 2.—Soils of the Conroe association.

Splendora soils have a dark grayish-brown fine sandy loam surface layer. The subsurface layer is grayish-brown fine sandy loam and is over lower layers of sandy clay loam mottled in shades of yellow, brown, and gray. These soils are nearly level and somewhat poorly drained.

Boy soils have a grayish-brown fine sand surface layer. The subsurface layer is pale-brown loamy fine sand and is over lower layers of light brownish-gray sandy clay loam mottled in shades of red and brown. These gently sloping soils are on ridges and are moderately well drained.

Segno soils have a very dark grayish-brown fine sandy loam surface layer. The subsurface layer is pale-brown fine sandy loam and is over lower layers of mottled yellowish-brown, red, and gray sandy clay loam. These soils are gently sloping and moderately well drained to well drained.

Sorter soils are deep, level, and poorly drained. Minor soils in the association are the Albany, Bibb, Blanton, Fuquay, Leefield, Tuckerman, and Waller.

This association is used mostly for pine timber. Suburban communities are extensive along the major highways. Near these communities are many small livestock farms. Although most of these soils are in timber, the better drained soils are well suited to pasture and crops.

3. Wicksburg-Susquehanna association

Deep, gently sloping, well drained and somewhat poorly drained, sandy and loamy soils that have clayey lower layers

This association occupies broad, gently sloping interstream divides and rolling side slopes along natural drains. (fig. 4).

This association comprises about 19 percent of the county. Wicksburg soils make up about 52 percent of the association, Susquehanna soils 35 percent, and minor soils 13 percent.

The Wicksburg soils have a grayish-brown loamy fine sand surface layer. The subsurface layer is brown loamy fine sand. Lower layers are sandy clay that is mottled below a depth of 35 inches.

Susquehanna soils have a dark grayish-brown fine sandy loam surface layer. The subsurface layer is pale-brown fine sandy loam. Lower layers are clay that is mottled in shades of red, gray, brown, and yellow.

Minor soils in the association are the Albany, Angie, Bibb, Blanton, Garner, Houston Black, and Tuscumbia.

Most of the Wicksburg-Susquehanna association is used for timber. Some small livestock farms and suburban communities are in the area.

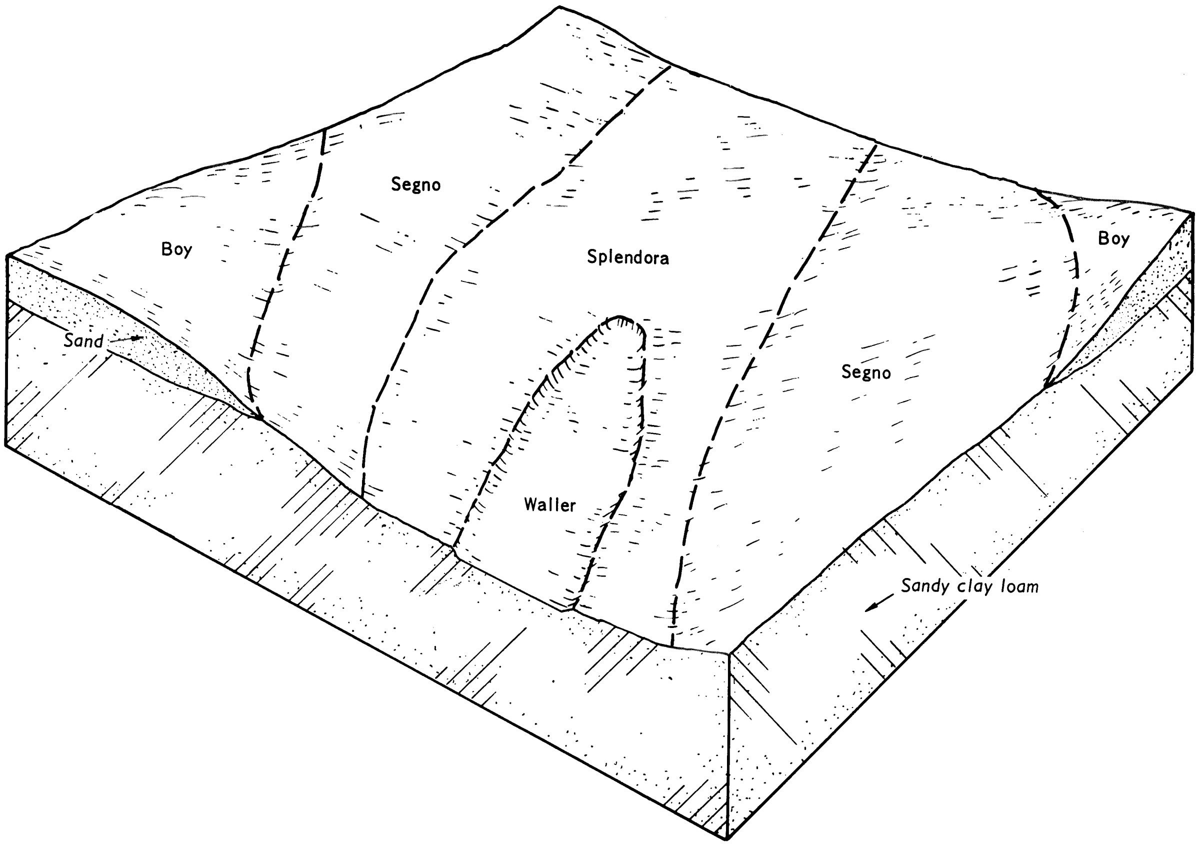


Figure 3.—**Soils of the Splendora-Boy-Segno association.**

4. Sorter association

Deep, level, poorly drained soils that are loamy throughout

This association occurs in flat to slightly depressed areas that have no well-defined drainage patterns. The water table is near the surface during much of the winter and spring, and this keeps the soils wet. Low sandy ridges are in some areas.

This association makes up about 10 percent of the county. Sorter soils account for about 52 percent of the association; Splendora, Fuquay, Leefield, and Waller soils 41 percent; and minor soils 7 percent.

Sorter soils are silt loam throughout. The surface layer is gray, and lower layers are light brownish gray. These soils are poorly drained.

Splendora soils have a fine sandy loam surface layer and mottled sandy clay loam lower layers. Fuquay and Leefield soils have a sandy surface layer that is over mottled sandy clay loam lower layers. Waller soils are loamy and occur in depressions. Splendora, Fuquay, and Leefield soils are better drained than Sorter soils and occupy higher parts of the landscape.

Minor soils in this association are the Bibb, Boy, and Segno.

This association is used for pine and hardwood timber. There are a few small livestock farms. Some small housing developments are on the better drained sandy ridges.

5. Ferris-Houston Black-Kipling association

Deep, gently sloping to rolling, firm, mainly clayey soils that have a high shrink-swell potential

This association is characterized by gently sloping ridgetops and steeper side slopes (fig. 5). The soils are mainly high shrink-swell clays that tend to erode on steeper slopes.

This association occupies about 8 percent of the county. Ferris soils make up about 32 percent of the association, Houston Black soils 13 percent, and Kipling soils 13 percent. Other less extensive soils make up 24 percent, and minor soils 18 percent.

Ferris soils are firm, calcareous clays that occur in the more sloping parts of the association. They show evidence of moderate to severe sheet and gully erosion.

Houston Black soils have clayey layers over dark-gray and olive clay mottled with yellowish red. These soils are on the more gently sloping ridges where erosion has been slight.

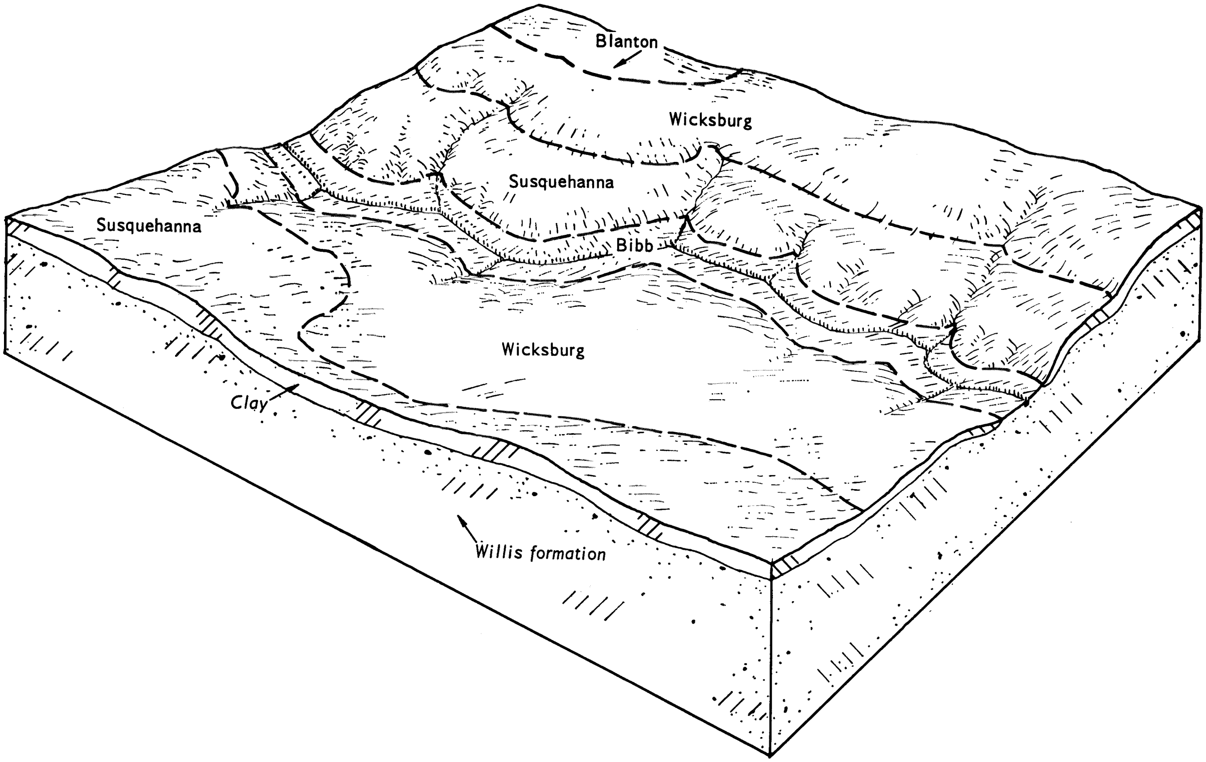


Figure 4.—**Soils of the Wicksburg-Susquehanna association.**

Kipling soils, also on ridgetops, have a dark-brown, loamy surface layer and lower layers of mottled clay.

Less extensive soils in this association are the Oktibbeha and Trinity. Oktibbeha soils have a dark-brown, loamy surface layer and lower layers of mottled clay, and are more sloping than Kipling soils. Trinity soils are on flood plains and are frequently flooded.

Minor soils in this association are the Burleson, Garner, Kaufman, Susquehanna, and Wicksburg.

This association is used mainly for raising livestock. Corn, small grain, and cotton also are grown.

6. Albany-Tuckerman association

Deep, level to gently sloping, somewhat poorly drained and poorly drained, sandy and loamy soils on low stream terraces

This association occupies broad stream terraces, poorly drained flats, and gently sloping, somewhat poorly drained, sandy ridges.

This association comprises about 7 percent of the county. Albany soils cover about 46 percent of the association, and Tuckerman soils 26 percent. Less extensive areas of Sorter and Chipley soils make up 10 percent, and minor soils 18 percent.

Albany soils have a dark grayish-brown fine sand surface layer. The subsurface layer, to a depth of about 47 inches, is brown fine sand. Lower layers are mottled fine sandy loam. Albany soils are nearly level, occur on stream terrace ridges, and are somewhat poorly drained.

Tuckerman soils have a grayish-brown loam surface layer over gray clay loam lower layers. They are nearly level and are poorly drained.

Sorter soils are mainly gray silt loam; they are level and poorly drained. Chipley soils are gently sloping, moderately well drained fine sands on low stream terraces. Minor soils in this association are the Crowley, Leefield, and Lucy soils.

This association is used mainly for pine timber.

7. Tuscumbia association

Poorly drained, very firm, clayey soils on flood plains

This association is made up mostly of clayey soils that developed in alluvium. They are subject to overflow.

This association occupies about 6 percent of the county. Tuscumbia soils make up about 59 percent of the association. Less extensive areas of Kosse and Kaufman soils make up 21 percent, and minor soils 20 percent.

Tuscumbia soils are grayish clays that are poorly drained.

Kosse soils are fine sandy loams, clay loams, or sandy clay loams. Kaufman soils are black clays. Minor soils are the Trinity, Bruno, Bibb, and Crevasse soils.

This association is used principally for hardwood timber. Large acreages have also been cleared for pasture.

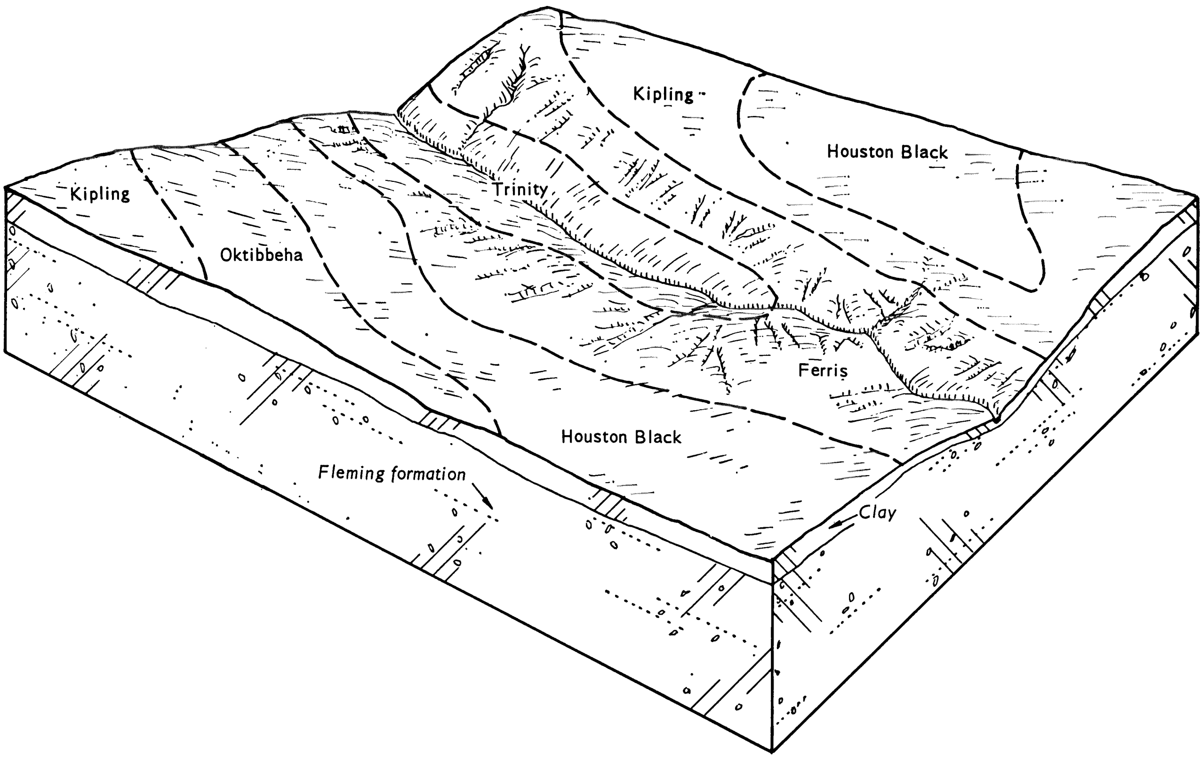


Figure 5.—**Soils of the Ferris-Houston Black-Kipling association.**

Soils of this association are subject to overflow and thus are not suitable for cultivation.

8. *Hockley-Katy association*

Deep, level to very gently sloping, well drained to somewhat poorly drained, loamy soils that have loamy or clayey lower layers

This association occupies low gently sloping ridges and nearly level areas.

It comprises about 1 percent of the county. Hockley soils make up about 50 percent of the association, and Katy soils 19 percent. Less extensive areas of Conroe, Edna, Katy, and Waller soils make up the remaining 31 percent of the association.

Hockley soils have fine sandy loam surface and subsurface layers, and these are over lower layers of mottled sandy clay loam. They are level to very gently sloping, occupy convex ridges, and are moderately well drained to well drained.

Katy soils have a fine sandy loam surface layer over mottled clay lower layers. These soils are level to very gently sloping; they occur on convex ridges and are somewhat poorly drained.

Conroe soils have a loamy fine sand surface layer containing ironstone gravel. Lower layers are mottled clay. Edna soils have a fine sandy loam surface layer over mottled clay lower layers. Edna soils occupy level to slightly depressed areas and are poorly drained. Waller soils have a loam surface layer over clay loam lower layers. They occupy flat poorly drained areas.

This association is used for crops, pasture, and vegetable farms.

Descriptions of the Soils

This section describes the soil series and mapping units of Montgomery County. Table 1 lists the approximate acreage and proportionate extent of each soil mapped.

The soils in a series are first discussed as a group. Important features that apply to all the soils in the series are described, and position of the soils on the landscape is given along with a short description of a typical soil profile.

This is followed by a detailed description of the same profile that scientists, engineers, and others can use in making highly technical interpretations. The detailed description of the profile is considered representative of all the soils in the series.

If the profile of a given mapping unit differs from this typical profile, the differences are stated in the description of the mapping unit. Range of soil characteristics, unusual features, and use and suitability of the soil are also discussed in each mapping unit. To get full information on

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Albany fine sand	30,831	4.4	Kipling soils, 0 to 1 percent slopes	880	.1
Angie fine sandy loam	2,739	.4	Kipling clay loam, 1 to 3 percent slopes	3,090	.4
Bibb soils, frequently flooded	21,373	3.1	Kosse soils, frequently flooded	7,436	1.1
Blanton fine sand, 0 to 5 percent slopes	21,574	3.1	Leefield loamy fine sand	4,706	.7
Blanton fine sand, 5 to 12 percent slopes	3,022	.4	Lucy loamy fine sand	2,346	.3
Boy fine sand	38,828	5.6	Oktibbeha soils, 2 to 5 percent slopes, eroded	6,679	1.0
Bruno loamy fine sand	3,018	.4	Osier-Chipley complex	1,328	.2
Burleson clay	1,957	.3	Robertsdale fine sandy loam	4,768	.7
Chipley fine sand	4,261	.6	Segno fine sandy loam	21,748	3.1
Conroe gravelly loamy fine sand, 0 to 5 percent slopes	21,998	3.1	Sorter silt loam	64,850	9.3
Conroe loamy fine sand, 0 to 5 percent slopes	72,159	10.3	Splendora fine sandy loam	51,497	7.4
Conroe loamy fine sand, 5 to 12 percent slopes	2,765	.4	Sunsweet soils	3,216	.5
Crevasse sand	697	.1	Susquehanna fine sandy loam, 1 to 5 percent slopes	39,225	5.6
Crowley fine sandy loam	4,133	.6	Susquehanna fine sandy loam, 5 to 12 percent slopes	9,043	1.3
Edna-Katy complex	468	(1)	Trinity clay, frequently flooded	1,796	.3
Eustis loamy fine sand	7,433	1.1	Trinity sandy clay loam, overwash	5,284	.8
Ferris clay, 1 to 5 percent slopes, eroded	11,635	1.7	Tuckerman loam, heavy substratum	16,615	2.4
Ferris clay, 5 to 8 percent slopes, eroded	5,582	.8	Tuscumbia clay, frequently flooded	28,035	4.0
Ferris-Gullied land complex, 3 to 8 percent slopes	1,624	.2	Waller loam	15,035	2.2
Fuquay loamy fine sand	46,125	6.6	Waller soils, ponded	2,101	.3
Fuquay loamy fine sand, terrace	4,255	.6	Wicksburg loamy fine sand, 1 to 5 percent slopes	51,743	7.4
Garner clay	2,697	.4	Wicksburg loamy fine sand, 5 to 12 percent slopes	18,950	2.7
Gunter fine sand	3,195	.5	Water	5,440	.8
Hockley fine sandy loam	2,560	.4			
Houston Black clay	7,378	1.0	Total	697,600	100.0
Katy fine sandy loam	982	.1			
Kaufman clay, frequently flooded	3,827	.5			
Kipling fine sandy loam, 1 to 3 percent slopes	4,673	.7			

[1] Less than 0.1 percent.

any one mapping unit, it is necessary to read both the description of the unit and description of the soil series to which the unit belongs.

Many terms used in the soil descriptions are defined in the Glossary at the back of this survey. The location and extent of the soils in the county are shown on the General Soil Map and map sheets at the back of this survey.

Soil colors in this section are expressed both in words and in Munsell color notations and are for moist soil unless otherwise specified.

Albany Series

The Albany series consists of nearly level and gently sloping, deep, somewhat poorly drained soils that are sandy to a depth of 40 to 60 inches and have loamy lower layers. These soils are on low stream terraces.

In a representative profile, the surface layer is dark grayish-brown fine sand about 6 inches thick. The subsurface layer is brown fine sand, about 41 inches thick, that has a few light-gray mottles. The next layer, to a depth of more than 72 inches, is fine sandy loam. It is brown in the upper part and light yellowish brown in the lower part.

Albany soils have a low available water capacity. They are used mainly for pine timber. A small acreage has been cleared for crops and pasture.

Representative profile of Albany fine sand in a timbered area 50 feet south of a pipeline from a point 300 feet east of a county road that is 1.0 mile east of the Rayford Road intersection. This "T" intersection is 4.0 miles southeast of Interstate 45 and 11.6 miles south of Texas Highway 105 at Conroe, Tex.

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) fine sand; weak granular structure; soft, friable; many tree roots; slightly acid; clear, smooth boundary.

A21—6 to 28 inches, brown (10YR 5/3) fine sand; structureless; slightly hard, very friable; few tree roots; slightly acid; gradual, smooth boundary.

A22—28 to 47 inches, brown (10YR 5/3) fine sand; few, faint, light-gray mottles; structureless; slightly hard, very friable; few, thin, brown sandy lamellae that have a combined thickness of 2½ inches; few, very fine, weakly cemented ferromanganese concretions; few fine roots; medium acid; clear, smooth boundary.

B21t—47 to 63 inches, brown (10YR 5/3) fine sandy loam; many, medium, distinct, yellowish-brown mottles and a few, medium, faint, light-gray mottles; weak, medium, subangular blocky structure; slightly hard, very friable; clay bridging between some sand grains; few, fine and medium, weakly cemented, black ferromanganese concretions; strongly acid; clear, smooth boundary.

B22t—63 to 83 inches, light yellowish-brown (10YR 6/4) fine sandy loam; common, medium and coarse, prominent, red mottles and medium, distinct, yellowish-brown and gray mottles; weak, medium, subangular blocky structure; slightly hard, friable; some of the red mottles have slightly hardened centers; very strongly acid.

The solum ranges from 60 to 100 inches in thickness. The A horizon ranges from slightly acid to strongly acid in reaction and from 40 to 60 inches in thickness. The A1 part of this horizon ranges from dark grayish brown to pale brown, and the rest of the horizon, from grayish brown to very pale brown. Light-gray or gray mottles occur in the A22 and B2t horizon. The B2t horizon is yellowish brown and brown to pale brown, is mottled with shades of gray, red, yellow, and brown, and is 10 to 35 percent clay. This horizon ranges from fine sandy loam to sandy clay loam in texture and from strongly acid to very strongly acid in reaction.

Albany fine sand (Ab)—This soil occupies slightly convex ridges on stream terraces. Slopes are dominantly 0 to 3 percent but range up to 6 percent. The soil areas are elongated and are 10 to 300 acres in size.

Included with this soil in mapping are small areas of nearly level Tuckerman loam, heavy substratum, and areas of nearly level Fuquay loamy fine sand, terrace. These included areas make up less than 10 percent of the total acreage.

Most areas of this Albany soil are used for pine timber. A few cleared areas are used for pasture and tilled crops. The tilled crops are small grain and corn. Coastal bermudagrass, common bermudagrass, and common lespedeza are the principal pasture plants. (Capability unit IIIs–2; woodland suitability group 3; pastureland and hayland group 3; woodland grazing group 3)

Angie Series

The Angie series consists of nearly level, deep, moderately well drained, loamy soils that have mottled clayey lower layers. These soils developed in loamy deposits on slightly convex ridges or stream terraces.

In a representative profile, the surface layer is grayish-brown fine sandy loam about 6 inches thick. The subsurface layer is brown fine sandy loam about 11 inches thick. Next, in sequence, are the following: about 6 inches of yellowish-brown sandy clay loam; 30 inches of brown, dark-red, and grayish-brown sandy clay that is mottled; and 19 inches of yellowish-brown, dark-red, and light-gray sandy clay loam.

Angie soils have a moderate available water capacity. They are used for pasture.

Representative profile of Angie fine sandy loam in a timbered area 1,600 feet north of a county road from a point 2.4 miles west of U.S. Highway 75, which is 2.4 miles north of Farm Road 1097 at Willis, Tex.

A1—0 to 6 inches, grayish-brown (10YR 5/2) fine sandy loam; structureless; slightly hard, friable; many tree roots; medium acid; clear, smooth boundary.

A2—6 to 17 inches, brown (10YR 5/3) fine sandy loam; structureless; slightly hard, very friable; few medium pebbles; many tree roots; slightly acid; clear, wavy boundary.

B1t—17 to 23 inches, yellowish-brown (10YR 5/6) sandy clay loam; weak, subangular blocky structure; hard, firm; sand grains are coated and bridged; many fine and medium pores; few tree roots; medium acid; clear, smooth boundary.

B21t—23 to 53 inches, coarsely and prominently mottled brown (10YR 5/3), dark-red (2.5YR 3/6), and grayish-brown (10YR 5/2) sandy clay; moderate, medium, blocky structure; very hard, very firm; clay films on ped surfaces; few fine roots; very strongly acid; clear, smooth boundary.

B22t—53 to 72 inches, coarsely and prominently mottled yellowish-brown (10YR 5/4), dark-red (10R 3/6), and light-gray (2.5Y 7/2) sandy clay loam; weak, medium, blocky structure; hard, firm; patchy clay films on horizontal ped surfaces; light gray silt and fine sand on the vertical ped surfaces; very strongly acid.

The solum is more than 60 inches thick. The A horizon ranges from slightly acid to medium acid in reaction, from 14 to 19 inches in thickness, and from light brown to brown in color.

The B1t horizon ranges from medium to strongly acid, from 6 to 8 inches in thickness, and from yellowish brown to strong brown in hues of 7.5YR and 10YR. The sandy clay B2t horizon is mottled in shades of gray, red, and brown and ranges from strongly acid to very strongly acid.

Angie fine sandy loam (An).—This soil occupies slightly convex ridges on stream terraces. Slopes are from 0 to 2 percent. The soil areas are elongated to irregular and 10 to 200 acres in size.

Included with this soil in mapping are small areas of Leefield loamy fine sand in slightly higher positions, Crowley fine sandy loam in slightly lower positions, and Tuckerman loam, heavy substratum, in poorly drained flats. These included areas amount to less than 15 percent of the total acreage.

Most areas of this Angie soil are used for pasture. Coastal bermudagrass, common bermudagrass, and common lespedeza are the principal pasture plants. A few small areas are used for corn, small grain, forage, and vegetable crops. In addition, a small acreage is used for pine timber. (Capability unit IIs–1; woodland suitability group 4; pastureland and hayland group 9; woodland grazing group 3)

Bibb Series

The Bibb series consists of nearly level, deep, poorly drained, loamy soils. These soils developed on flood plains and are usually saturated with water during the winter months.

In a representative profile, the surface layer is grayish-brown very fine sandy loam about 10 inches thick. The next layer is about 10 inches of grayish-brown very fine sandy loam underlain by about 43 inches of gray very fine sandy loam.

Bibb soils have a moderate available water capacity. They are used mainly for hardwood timber. A small acreage is in pasture.

Representative profile of Bibb very fine sandy loam in an area of Bibb soils, frequently flooded, in a timbered area 100 feet north of firelane road from a point 0.65 mile east of a county road that is 0.7 mile north of Farm Road 2090, which is 3.9 miles east of Farm Road 3083 at Grangerland, 7.7 miles south of Texas Highway 105, and 2.2 miles east of U.S. Highway 75 at Conroe, Tex.

A—0 to 10 inches, grayish-brown (10YR 5/2) very fine sandy loam; common, fine, distinct, brown mottles; structureless; hard, friable; many fine and medium pores; many tree roots; strongly acid; clear, smooth boundary.

C1g—10 to 20 inches, grayish-brown (10YR 5/2) very fine sandy loam; few, fine, prominent, reddish-brown mottles; structureless; hard, friable; many tree roots; contains few strata of white silt loam; many, fine and very fine, vesicular pores; strongly acid; clear, smooth boundary.

C2g—20 to 63 inches, gray (10YR 5/1) very fine sandy loam; common pockets and strata of very pale brown and white silt loam; structureless; hard, friable; few vesicular pores; strongly acid.

The A horizon ranges from 6 to 12 inches in thickness, from light gray to grayish brown in color, and clay loam to loamy fine sand in texture.

The C1g and C2g horizons range from light gray to gray, from fine sandy loam to very fine sandy loam, and they contain thin strata of silt loam, sandy clay loam, or fine sand. Stratification is more noticeable below a depth of 35 inches.

Reaction is strongly to very strongly acid throughout the profile. Reddish-brown or brown mottles range from few to many from the surface down through the profile. The alluvium parent material of this soil is from 5 to about 20 feet thick.

Bibb soils, frequently flooded (Bb).—These soils have slopes of less than 1 percent and occupy the flood plain of streams draining sandy and loamy soils. The areas are elongated and are 10 to more than 500 acres in size.

Bibb soils make up about 55 percent of this mapping unit. They occur along stream channels and between the natural levees of the channels and the uplands. About 25 percent of the unit is soils like Bibb except for browner colors, and 20 percent soils that have clay loam to sandy clay loam at a depth of 10 to 40 inches. These included areas are next to the upland on the large flood plains and in the lowest parts of the smaller flood plains.

Bibb soils are used primarily for hardwood timber. They are not suited to cultivation, because they are flooded a number of times each year, and the water table is at or near the surface for 2 to 6 months during the cool season of the year.

A few areas are cleared for pasture. The pasture plants are dallisgrass, common bermudagrass, carpetgrass and common lespedeza. (Capability unit VIw–1; woodland suitability group 1; pastureland and hayland group 10; woodland grazing group 1)

Blanton Series

The Blanton series consists of nearly level to rolling, deep, somewhat excessively drained soils that are sandy to a depth of more than 40 inches.

In a representative profile, the surface layer is dark grayish-brown fine sand about 5 inches thick. The subsurface layer is pale-brown fine sand about 43 inches thick. The next layer, to a depth of more than 90 inches, is pale-brown fine sand that contains discontinuous strata of fine sandy loam.

Blanton soils are rapidly permeable and have a low available water capacity. These soils are used mainly for pine timber. A small acreage is in pasture or crops.

Representative profile of Blanton fine sand, 0 to 5 percent slopes, in a timbered area 150 feet north of Old Montgomery Road (Farm Road 2854) from a point 7.6 miles west of Interstate 45 at Conroe, Tex.

A1—0 to 5 inches, dark grayish-brown (10YR 4/2) fine sand; structureless; loose; many tree roots; slightly acid; clear, smooth boundary.

A21—5 to 18 inches, pale-brown (10YR 6/3) fine sand; structureless; few, faint, yellowish-brown mottles; loose; many tree roots; very strongly acid; gradual, smooth boundary.

A22—18 to 26 inches, pale-brown (10YR 6/3) fine sand; common, coarse, distinct, brown (10YR 5/3) and yellowish-brown (10YR 5/4) mottles; structureless; loose; many tree roots; very strongly acid; gradual, smooth boundary.

A23—26 to 48 inches, pale-brown (10YR 6/3) fine sand; structureless; loose; many tree roots; very strongly acid; gradual, smooth boundary.

A24&B1t—48 to 66 inches, pale-brown (10YR 6/3) fine sand; few, discontinuous, yellowish-red (5YR 5/6) loamy fine sand lamellae one-quarter inch thick; structureless; loose; few tree roots; strongly acid; gradual, smooth boundary.

A25&B2t—66 to 90 inches, pale-brown (10YR 6/3) fine sand; few, yellowish-red (5YR 5/6) fine sandy loam lamellae one-half inch thick; structureless; loose; strongly acid.

The solum is more than 80 inches thick. The A1 horizon ranges from 4 to 8 inches in thickness and from light brownish gray to dark grayish brown in color. The A2 horizon ranges from 36 to 72 inches in thickness and from pale brown to very pale brown or light yellowish brown in color. In places it is mottled in shades of yellowish brown or brown.

The Bt horizons range from very pale brown to pale brown or light yellowish brown and contain lamellae of reddish-brown to reddish-yellow loamy fine sand or fine sandy loam. They are mottled in places with shades of yellowish brown or brown.

Soils correlated as Blanton in Montgomery County are outside of the defined range for the series in that they lack a continuous Bt horizon within 80 inches of the surface. They are enough alike in morphology, composition, and behavior so that a new series is not warranted.

Blanton fine sand, 0 to 5 percent slopes (BlC).—This soil occupies convex slopes on ridge crests. Soil areas are irregular and are 10 to 250 acres in size.

This soil has the profile described as representative for the series.

Included with this soil in mapping are small areas of Eustis loamy fine sand and Boy fine sand. Also included are small areas of long, narrow, steep breaks of Blanton fine sand, 5 to 12 percent slopes. These included areas comprise less than 10 percent of the total acreage.

Blanton fine sand, 0 to 5 percent slopes, is used mainly for pine timber. A few cleared areas are used for crops and pasture. Crops are corn, small grain, and forage. Coastal bermudagrass and common bermudagrass are the principal pasture plants. (Capability unit IIIs–2; woodland suitability group 6; pastureland and hayland group 7; woodland grazing group 3)

Blanton fine sand, 5 to 12 percent slopes (BlD).—This soil occupies convex slope breaks. Soil areas are elongated and are 20 to 150 acres in size.

The surface layer is dark grayish-brown, loose fine sand 4 inches thick. The subsurface layer is very pale brown fine sand, 42 inches thick, that contains yellowish-brown mottles. The next layers are very pale-brown fine sand that contain lamellae of fine sandy loam.

Included with this soil in mapping are small areas of Wicksburg loamy fine sand and Eustis loamy fine sand. Small areas of Blanton fine sand, 0 to 5 percent slopes, are included, as well as a few areas as steep as 15 percent. These included areas comprise less than 10 percent of the total acreage.

Blanton fine sand, 5 to 12 percent slopes, is used mostly for pine timber. A few small areas have been cleared for pasture. Common bermudagrass and Coastal bermudagrass are the principal pasture plants. (Capability unit IVs–2; woodland suitability group 6; pastureland and hayland group 7; woodland grazing group 3)

Boy Series

The Boy series consists of nearly level to gently sloping, deep, moderately well drained soils that are sandy to a depth of 40 to 60 inches and have a mottled loamy lower layer. These soils are on uplands.

In a representative profile, the surface layer is grayish-brown fine sand about 7 inches thick. The subsurface layer is pale-brown loamy fine sand about 40 inches thick. The next layer, to a depth of more than 70 inches, is light brownish-gray sandy clay loam mottled in shades of red and strong brown.

Boy soils have a low available water capacity. They are used for pine timber, and a small acreage is in pasture or crops.

Representative profile of Boy fine sand in a timbered area 150 feet south of Grogan Road from a point 1.2 miles east of Interstate 45 and 3.4 miles south of Texas Highway 105, at Conroe, Tex.

A1—0 to 7 inches, grayish-brown (10YR 5/2) fine sand; structureless; loose; many tree roots; very strongly acid; clear, smooth boundary.

A21—7 to 35 inches, pale-brown (10YR 6/3) loamy fine sand; few, coarse, faint, yellowish-brown (10YR 5/4) mottles that occur irregularly in groups throughout the horizon; loose; very friable; many tree roots; strongly acid; clear, wavy boundary.

A22—35 to 47 inches, pale-brown (10YR 6/3) loamy fine sand; common, coarse, faint, yellowish-brown (10YR 5/4) mottles and a few, distinct, yellowish-red mottles that are irregularly grouped throughout the horizon; slightly brittle; very friable; few, fine, rounded quartz pebbles; few tree roots; strongly acid; clear, wavy boundary.

B2t—47 to 70 inches, light brownish-gray (10YR 6/2) sandy clay loam; common, coarse, prominent, red (2.5YR 4/8) mottles and common, medium, distinct, strong-brown (7.5YR 5/6) mottles; weak subangular blocky structure; slightly brittle; friable; patchy clay films; few fine pores; 20 percent plinthite that is red surrounded by strong brown, which in turn is surrounded by gray; few fine roots; strongly acid.

The solum ranges from 60 to more than 100 inches in thickness. The A horizon ranges from 40 to 60 inches in thickness. The upper few inches are slightly darker than the lower part. The lower part of the A horizon has few to common yellowish-red, yellowish-brown, light-brown, or dark-brown mottles of slightly heavier material.

The Bt horizon is fine sandy loam to sandy clay loam. The matrix is light brownish gray to light gray in hues of 10YR and 2.5Y, and contains strong-brown, red, reddish-yellow or brownish-yellow mottles.

Soft nonindurated plinthite content ranges from 15 to 25 percent. Depth to a horizon containing plinthite ranges from 40 to 60 inches.

Boy fine sand (Bo).—This level to gently sloping soil occupies convex areas. Slopes are dominantly 0 to 5 percent but in places range up to 7 percent. The soil areas are elongated to irregular and 20 to 300 acres in size.

Included with this soil in mapping are small, nearly level areas of Leefield loamy fine sand, and slightly depressed areas of Sorter silt loam. These included areas comprise less than 10 percent of the total acreage.

Boy fine sand is used mainly for pine timber. A few small areas have been cleared for crops and pasture. The crops are small grain, corn, and forage. Coastal bermudagrass, common bermudagrass, and common lespedeza are the principal pasture plants. (Capability unit IIIs–2; woodland suitability group 3; pastureland and hayland group 3; woodland grazing group 3)

Bruno Series

The Bruno series consists of nearly level, deep, excessively drained, sandy soils on natural levees, next to the channels, on the flood plain of streams.

In a representative profile, the surface layer is brown loamy fine sand about 12 inches thick. Next, in sequence, are the following: about 31 inches of pale-brown loamy sand; 18 inches of very pale brown loamy sand; 23 inches of pale-brown loamy sand; and 12 inches of light brownish-gray sand.

Bruno soils have a low available water capacity. They are used for hardwood and pine timber, and a few small areas are in pasture.

Representative profile of Bruno loamy fine sand in a timbered area 900 feet north of a fence that is 0.9 mile north of a house located on Farm Road 1774, 3.0 miles west of Farm Road 1488 at Magnolia, Tex.

A—0 to 12 inches, brown (10YR 5/3) loamy fine sand; structureless; loose; slightly hard, very friable; many tree roots; medium acid; clear, wavy boundary.

C1—12 to 43 inches, pale-brown (10 YR 6/3) loamy sand; few, thin, yellowish-brown strata of fine sandy loam; structureless; loose; medium acid; clear, wavy boundary.

C2—43 to 61 inches, very pale-brown (10YR 7/3) loamy sand; few, distinct, coarse, dark yellowish-brown (10YR 4/4) and light-brown (7.5YR 6/4) mottles; structureless; very friable; very strongly acid; clear, smooth boundary.

C3—61 to 84 inches, pale-brown (10YR 6/3) loamy sand; common, coarse, distinct, dark-brown (7.5YR 4/4) mottles that have yellowish-red centers and are slightly brittle; structureless; loose; strongly acid; clear, smooth boundary.

C4—84 to 96 inches, light brownish-gray (10YR 6/2) sand; common, medium, distinct, brown mottles; structureless; loose; strongly acid.

The A horizon ranges from 7 to 22 inches in thickness and from dark grayish brown to brown in color.

The C horizons are very pale brown to pale brown in color and loamy fine sand to sand in texture. Most areas contain dark-brown or dark yellowish-brown mottles.

Bruno loamy fine sand (Br).—This soil occupies the natural levees next to the channel in the flood plain of streams. It has a plane to slightly convex slope of less than 1 percent. Soil areas are elongated and are 10 to 150 acres in size.

Included with this soil in mapping are small areas that have an overwash of sandy loam and sandy clay loam 3 to 6 inches thick. Also included are small areas of Crevasse sand and Bibb soils, frequently flooded. These included areas comprise less than 10 percent of the total acreage.

Bruno loamy fine sand is used primarily for hardwood and pine timber. Small areas have been cleared for pasture. Common bermudagrass, Coastal bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. Frequent flooding limits the use of this soil. (Capability unit Vw–2; woodland suitability group 1; pastureland and hayland group 12; woodland grazing group 1)

Burleson Series

The Burleson series consists of nearly level, deep, moderately well drained, noncalcareous, clayey soils. These soils developed in clayey deposits on marine or stream terraces.

In a representative profile, the soil is characterized by microrelief of highs and lows. The microlows dominate. The surface layer of a microlow is black clay about 22 inches thick. The next layer is very dark gray clay about 13 inches thick underlain by dark gray clay about 15 inches thick.

Burleson soils have a moderately high available water capacity. These soils are used mainly for pasture, but a small acreage is in crops.

Representative profile of Burleson clay in a meadow 0.6 mile southwest of Old Montgomery Road from a point 1.2

miles south of Texas Highway 105, which is 14.4 miles west of U.S. Highway 75 at Conroe, Tex.

Microlow.

A11—0 to 22 inches, black (N 2/0) clay; moderate, very fine and fine, blocky structure; very hard, firm, sticky and plastic; surfaces of peds have shiny pressure faces; few, very fine, indurated, black concretions; few, fine and medium, siliceous pebbles; neutral; gradual, wavy boundary.

A12—22 to 35 inches, very dark gray (N 3/0) clay; moderate, coarse, blocky structure; very hard, firm, sticky and plastic; few, very fine, indurated, black concretions; few, fine and medium, siliceous pebbles; contains slickensides that intersect; mildly alkaline; gradual, wavy boundary.

AC—35 to 50 inches, dark-gray (10YR 4/1) clay; weak, coarse, blocky structure; very hard, firm, sticky and plastic; contains slickensides that intersect; common to many, soft and strongly cemented, calcium carbonate concretions; moderately alkaline.

Microhigh.

A11—0 to 5 inches, very dark gray (10YR 3/1) clay; moderate, medium, blocky structure; very hard, very firm, very sticky and plastic; few, fine, water-worn, siliceous pebbles; many grass roots; neutral; clear, wavy boundary.

A12—5 to 18 inches, black (10YR 2/1) clay; moderate, medium, blocky structure; very hard, very firm, very sticky and plastic; contains slickensides that intersect; few grass roots; few, very fine, indurated, black concretions; neutral; clear, wavy boundary.

AC—18 to 29 inches, dark-gray (10YR 4/1) clay; moderate, coarse, blocky structure; very hard, very firm, very sticky and plastic; few, medium, siliceous pebbles; contains slickensides that intersect; mildly alkaline; gradual, wavy boundary.

C—29 to 50 inches, grayish-brown (2.5Y 5/2) clay; many, medium, faint, light olive-brown (2.5Y 5/4) mottles; weak, coarse, blocky structure; very hard, very firm, very sticky and plastic; contains slickensides that intersect; few, coarse, siliceous pebbles; few, very fine, weakly cemented ferromanganese concretions; common to many, soft and strongly cemented, calcium carbonate concretions; moderately alkaline.

The solum ranges from 40 to 100 inches in thickness. More than 75 percent of the profile is like the microlow. The soil is usually moist at a depth of between 7 and 20 inches. When dry, it has cracks ranging from 0.4 to 1.5 inches in width at a depth of 20 inches. These cracks open and close each year. They remain open for 90 to 150 cumulative days during most years. In native grass areas, there is gilgai microrelief consisting of knolls 3 to 10 inches higher than the depressions. Distance between the center of the knolls and the center of the depressions ranges from 5 to 12 feet. Intersecting slickensides begin 20 to 30 inches below the soil surface.

In cultivated areas, the A horizon has a gray to light-gray surface crust that ranges from 1/16 to 1/2 inch in thickness. The A horizon ranges from 6 inches thick in the microhighs to 50 inches thick in the microlows. It is very dark gray to black in hues of 10YR and 2.5Y; it ranges from slightly acid to mildly alkaline in reaction but is noncalcareous.

The AC horizon ranges from 8 to 36 inches in thickness, from dark gray to gray in hues of 10YR and 2.5Y, from neutral to moderately alkaline, and from noncalcareous to calcareous.

The C horizon is grayish brown to olive gray, contains light olive-brown or olive-yellow mottles, is neutral to moderately alkaline, and is noncalcareous to calcareous. It also contains common to many, soft and hard, calcium carbonate concretions.

Burleson clay (Bu).—This level to slightly convex soil occupies stream terraces and upland prairies. Dominant slopes are 0 to 2 percent, but range up to 3 percent. Soil areas are irregularly elongated or rounded and 10 to 100 acres in size.

Included with this soil in mapping are small areas of Garner clay and Houston Black clay. These included areas make up less than 10 percent of the total acreage.

Most areas of Burleson clay are used for pasture. A limited acreage is in crops and timber. Dallisgrass, common bermudagrass, and common lespedeza are the principal pasture plants. The principal crops are cotton, corn, grain sorghum, small grain, and forage. (Capability unit IIIe-1; woodland suitability group 10; pastureland and hayland group 8; woodland grazing group 5)

Chipley Series

The Chipley series consists of level to gently sloping, deep, moderately well drained sandy soils. These soils occur on low stream terraces and on flood plains.

In a representative profile, the surface layer is grayish-brown fine sand about 5 inches thick. The next layers, in sequence, are about 10 inches of pale brown fine sand; 44 inches of very pale brown fine sand; and 21 inches of light brownish-gray fine sand.

Chipley soils have a low available water capacity. They are used mainly for pine timber, but a small acreage is in pasture.

Representative profile of Chipley fine sand in a timbered area 50 feet west of a pipeline from a point 400 feet south of the intersection of two pipelines, which is 0.8 mile east of a tram road that is 0.5 mile south of a county road, 6.5 miles southeast of the intersection of Rayford Road and Interstate 45, and 13.6 miles south of Texas Highway 105 at Conroe, Tex.

A1—0 to 5 inches, grayish-brown (10YR 5/2) fine sand; structureless; slightly hard, very friable; many tree roots; medium acid; clear, smooth boundary.

C1—5 to 15 inches, pale-brown (10YR 6/3) fine sand; structureless; soft, very friable; many tree roots; slightly acid; clear, wavy boundary.

C2—15 to 59 inches, very pale brown (10YR 7/3) fine sand; faint light-gray mottles; common, medium, distinct, strong-brown (7.5YR 5/6) and yellowish-brown (10YR 5/8) mottles that have very fine, soft, reddish-brown concretions in their centers; structureless; slightly hard, very friable; medium acid; abrupt, smooth boundary.

C3—59 to 80 inches, light brownish-gray (10YR 6/2) fine sand; common, medium, distinct, reddish-yellow (7.5YR 6/6) mottles, a few of which have dark red centers that are slightly brittle; structureless; friable; very strongly acid.

This soil is more than 72 inches thick. The A1 horizon ranges from 3 to 6 inches in thickness, dark grayish brown to light brownish gray in color, and from slightly acid to very strongly acid in reaction.

The C1 and C2 horizons combined are 26 to 60 inches thick, pale brown to very pale brown in hues of 10YR and 2.5Y, and mottled in shades of gray and brown.

The C3 horizon is light brownish gray to pale brown in hues of 10YR and 2.5Y and is a fine sand or sand in texture. A few, small, rounded, siliceous pebbles are present in some places.

Chipley fine sand (Ch).—This level to gently sloping soil occupies convex areas on low stream terraces and isolated areas in some stream bottoms. Slopes are dominantly 0 to 5 percent but range up to 8 percent. Soil areas are elongated and are 10 to 150 acres in size.

Included with this soil in mapping are small areas of Leefield loamy fine sand and Osier soils that occupy nearly level areas. These included areas make up less than 5 percent of the total acreage.

Chipley fine sand is used mainly for pine timber. A few cleared areas are in pasture. Coastal bermudagrass, common bermudagrass, dallisgrass, and common lespedeza are the principal pasture plants. (Capability unit IIIs-2; woodland suitability group 3; pastureland and hayland group 3; woodland grazing group 3)

Conroe Series

The Conroe series consists of nearly level to rolling, deep, moderately well drained to well drained soils that are sandy to a depth of 20 to 40 inches and have clayey lower layers.

In a representative profile, the surface layer is grayish-brown loamy fine sand about 3 inches thick. The subsurface layer is light yellowish-brown loamy fine sand about 21 inches thick. Next, in sequence, are the following: about 3 inches of yellowish-brown sandy clay loam; 12 inches of yellowish-brown clay mottled with red; and 36 inches of brittle clay mottled in shades of red, yellow, gray and brown.

Conroe soils have a moderate available water capacity. They are used for pine timber and, in a few areas, for crops and pasture.

Representative profile of Conroe loamy fine sand, 0 to 5 percent slopes, in a timbered area, 400 feet north from a point 760 feet along a log road that starts at League Line Road 2.9 miles west of the intersection of League Line Road and U.S. Highway 75, which is 3.9 miles north of Texas Highway 105 at Conroe, Tex.

A1—0 to 3 inches, grayish-brown (10YR 5/2) loamy fine sand; weak granular structure; soft, very friable; many tree roots; few, fine and medium, indurated ironstone concretions; medium acid; clear, smooth boundary.

A2—3 to 24 inches, light yellowish-brown (10YR 6/4) loamy fine sand; structureless; slightly hard, very friable; many tree roots; about 10 percent, fine and medium, indurated ironstone concretions; strongly acid; clear, wavy boundary.

B1t—24 to 27 inches, yellowish-brown (10YR 5/8) sandy clay loam; few, prominent, red mottles; moderate, fine, subangular blocky structure; hard, friable; some red mottles surround weakly cemented ironstone concretions; few, fine and medium, indurated ironstone concretions; many tree roots; very strongly acid; clear, smooth boundary.

B21t—27 to 39 inches, yellowish-brown (10YR 5/8) clay; many, medium and coarse, prominent, red (10R 4/8) mottles; moderate, fine and medium, blocky structure; very hard, very firm; clay films on ped surfaces; horizon is about 35 percent plinthite; few, fine and medium, indurated ironstone concretions; common tree roots; strongly acid; gradual, smooth boundary.

B22t—39 to 54 inches, coarsely and prominently mottled red (10R 4/6), brownish-yellow (10YR 6/6), and light-gray (N 7/0) clay; moderate, fine, blocky structure; very firm and brittle; clay films on ped surfaces; red mottles are bridged together; horizon is about 40 percent plinthite; many red mottles surround weakly cemented ironstone concretions; tree roots are in the gray soil material but not the red, cemented part; very strongly acid; gradual, smooth boundary.

B23t—54 to 75 inches, reticulately mottled weak-red (10R 4/4), light-gray (10YR 6/1), and strong-brown (7.5YR 5/8) clay; moderate, fine, blocky structure; very firm and brittle; thick continuous clay films on peds; red mottles bridge many ped surfaces; horizon is about 40 percent plinthite; many red mottles surround weakly cemented ironstone concretions; few tree roots in the light-gray soil material, but no roots penetrate the red part; very strongly acid.

The solum is 60 to more than 100 inches thick. The A horizon ranges from 20 to 40 inches in thickness. The A1 part is dark grayish brown to very pale brown, and the A2 part is gray to very pale brown. This horizon is 5 to 50 percent weakly cemented to indurated ironstone concretions.

The B1t horizon ranges from 3 to 6 inches in thickness, from light yellowish brown to yellowish brown in color, and from sandy clay loam to sandy clay in texture. It contains few to many red mottles. The B21t horizon is 7 to 18 inches thick, light yellowish brown to yellowish brown or brownish yellow, and sandy clay to clay. It has common to many red or reddish-yellow mottles. Plinthite makes up 35 to 50 percent of this horizon.

Conroe gravelly loamy fine sand, 0 to 5 percent slopes (CnC).—This nearly level to gently sloping soil is on broad ridges that have convex slopes. The areas are irregularly rounded or elongated and 10 to 500 acres in size.

The typical surface layer is grayish-brown, very friable gravelly loamy fine sand 25 inches thick. It is 30 percent indurated ironstone concretions. The upper few inches of the next layer is yellowish-brown friable sandy clay loam that has red mottles. This is underlain by coarse reticulately mottled red, brownish-yellow, and light-gray sandy clay, which is brittle within about 12 inches of its upper boundary. Tap roots of pine trees branch out in this layer and do not penetrate the brittle clay.

Included with this soil are small areas of Conroe loamy fine sand, less than 15 percent of which is ironstone concretions. The included areas amount to less than 10 percent of the total acreage.

Conroe gravelly loamy fine sand, 0 to 5 percent slopes, is used mainly for pine timber. Only small areas are in pasture. The surface layer, because of its high content of ironstone concretions, is used as a subbase in highway construction. (Capability unit IIIs-1; woodland suitability group 8; pastureland and hayland group 1; woodland grazing group 3)

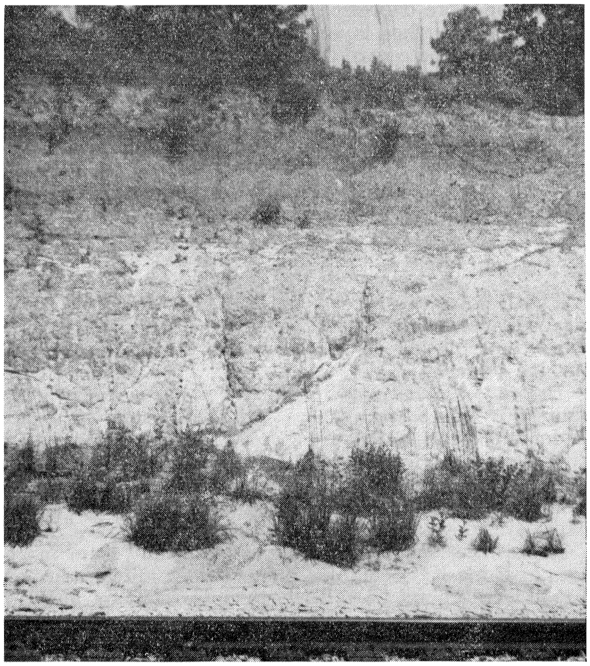
Conroe loamy fine sand, 0 to 5 percent slopes (CoC).—This nearly level to gently sloping soil occupies broad ridges and has convex slopes. The areas are irregular and 10 to 500 acres in size. This soil has the profile described as representative for the series (fig. 6, top). A brittle layer at a depth of about 39 inches prevents tap roots of pine trees from penetrating (fig. 6, bottom).

Included with this soil are small areas of Gunter fine sand, Blanton fine sand, Fuquay loamy fine sand, and Conroe loamy fine sand, 5 to 12 percent slopes. These included areas amount to less than 15 percent of the total acreage.

Conroe loamy fine sand, 0 to 5 percent slopes, is used chiefly for pine timber. Small areas have been cleared for pasture and crops. Coastal bermudagrass, common bermudagrass, and common lespedeza are the principal pasture plants. Corn, small grain, and forage are the main crops. (Capability unit IIIs-1; woodland suitability group 8; pastureland and hayland group 1; woodland grazing group 3)

Conroe loamy fine sand, 5 to 12 percent slopes (CoD).—This sloping soil is along intermittent drains in association with other Conroe soils. The areas are elongated and 10 to 275 acres in size.

The surface layer is grayish-brown, very friable loamy fine sand 23 inches thick. This layer is 10 percent ironstone concretions. The next layer is 8 inches of yellowish-brown, friable sandy clay loam that has red mottles. Below this



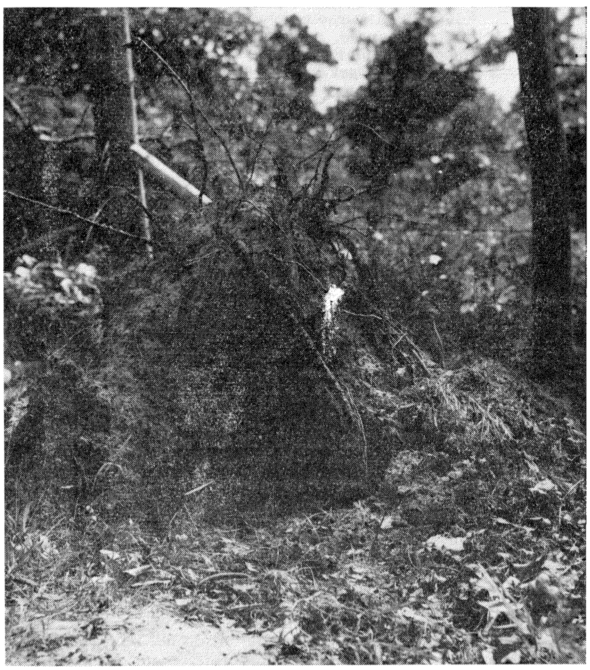


Figure 6.—Conroe loamy fine sand, 0 to 5 percent slopes. *Top,* profile showing loamy fine sand surface layer over mottled clay. *Bottom,* windthrow of shortleaf pine caused by relatively shallow depth to brittle layer that restricts penetration of roots.

is reticulately mottled red, brownish-yellow, and light-gray sandy clay.

Mapped with this soil are small areas of Blanton fine sand, 5 to 12 percent slopes; Wicksburg loamy fine sand, 5 to 12 percent slopes; and Conroe loamy fine sand, 0 to 5 percent slopes. These included areas amount to less than 10 percent of the total acreage.

Conroe loamy fine sand, 5 to 12 percent slopes, is used for pine timber. (Capability unit VIe–2; woodland suitability group 8; pastureland and hayland group 1; woodland grazing group 3)

Crevasse Series

The Crevasse series consists of nearly level to gently sloping, deep, excessively drained sands. These soils are in river channels.

In a representative profile, the surface layer is a light-gray sand about 6 inches thick. The next layers, to a depth of more than 63 inches, are sand. The C1 horizon is white, and the C2 horizon is very pale brown.

Crevasse soils have a low available water capacity. These soils have no vegetative cover and are used as a source of sand.

Representative profile of Crevasse sand on a sand bar in the West Fork of the San Jacinto River 1.1 miles northeast of the gate separating a private road and Rayford Road, which is 7.1 miles east and northeast from the intersection of Rayford Road and Interstate 45, and 13.6 miles south of the intersection of Texas Highway 105 and U.S. Highway 75 at Conroe, Tex.

A—0 to 6 inches, light-gray (10YR 7/2) sand; structureless; loose; few, very coarse, siliceous pebbles; slightly acid; gradual, smooth boundary.

C1—6 to 11 inches, white (10YR 8/2) sand; structureless; loose; few, very coarse siliceous pebbles; medium acid; clear, smooth boundary.

C2—11 to 63 inches, very pale-brown (10YR 8/3) sand that has streaks of brown; structureless; loose; few, very coarse, siliceous pebbles; slightly acid.

The A horizon is variable, as it is subject to change with each flooding. It is 6 to 12 inches thick and light gray to white or very pale brown in color. The C horizons are 60 to more than 100 inches thick and are very pale brown to white.

Crevasse sand (Cr).—This soil occupies the sandbars of stream channels and has convex slopes that range from less than 1 percent to 5 percent. It is subject to flooding at each rise in the river. This mapping unit is locally known as sandbars. The areas are crescent shaped and are 7 to 15 acres in size.

Crevasse sand is used as a source of sized sand for golf courses, concrete block plants, highway construction, and fill sand for concrete slabs. This soil has no grass cover, and only a few annual weeds, such as bladderpod, will grow on it. (Capability unit Vw–2; pastureland and hayland group 12)

Crowley Series

The Crowley series consists of nearly level, deep, somewhat poorly drained, loamy soils that have mottled clayey lower layers. These soils developed in clayey deposits on ancient stream terraces.

In a representative profile, the surface layer is grayish-brown fine sandy loam about 5 inches thick. The subsurface layer is light brownish-gray fine sandy loam about 10 inches thick. The next layers, in sequence, are the following: about 17 inches of light brownish-gray clay that contains yellowish-red mottles; 11 inches of light brownish-gray clay that contains strong-brown mottles; 13 inches of light brownish-gray clay that contains light olive-brown mottles; 12 inches of light-gray clay that has yellowish-brown mottles; and 12 inches of light-gray sandy clay.

Crowley soils have a moderately high available water capacity. They are used primarily for pine timber. A small acreage is in crops and pasture.

Representative profile of Crowley fine sandy loam in a timbered area 500 feet west on a logging road from a point 100 feet south of Farm Road 1488 on the east boundary line road of W. Goodrich Jones State Forest, which is 3.4 miles west of Interstate 45, and 5.6 miles south of Texas Highway 105 at Conroe, Tex.

A1—0 to 5 inches, grayish-brown (10YR 5/2) fine sandy loam; few, medium, faint, dark yellowish-brown mottles; 0 to 2 inches, weak granular structure; 2 to 5 inches, structureless; slightly hard, friable; many tree roots; medium acid; clear, smooth boundary.

A2—5 to 15 inches, light brownish-gray (2.5Y 6/2) fine sandy loam; few, fine, faint, light yellowish-brown mottles; structureless; slightly hard, friable; many tree roots; strongly acid; abrupt, wavy boundary.

B21tg—15 to 32 inches, light brownish-gray (2.5Y 6/2) clay; common, medium, prominent, yellowish-red (5YR 5/6) mottles; moderate, coarse, blocky structure; very hard, very firm; sticky and plastic; clay films on ped surfaces; few tree roots; very strongly acid; gradual, smooth boundary.

B22tg—32 to 43 inches, light brownish-gray (2.5Y 6/2) clay; few, fine, distinct, strong-brown mottles; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; clay films on ped surfaces; few fine tree roots; strongly acid; clear, smooth boundary.

B3tg—43 to 56 inches, light brownish-gray (2.5Y 6/2) clay; few, fine, faint, light olive-brown mottles; weak, coarse, blocky structure; very hard, very firm, sticky and plastic; patchy clay films on ped surfaces; slightly acid; gradual, smooth boundary.

C1g—56 to 68 inches, light-gray (5Y 7/2) clay; common, coarse, distinct, yellowish-brown (10YR 5/6) and dark yellowish-brown (10YR 4/4) mottles; massive; very hard, very firm, sticky and plastic; neutral; gradual, smooth boundary.

C2g—68 to 80 inches, light-gray (2.5Y 7/2) sandy clay; massive; very hard, firm; few, very fine, soft, white gypsum crystals; neutral.

The solum ranges from 48 to 60 inches in thickness. The A horizon ranges from 10 to 20 inches in thickness, from very strongly acid to slightly acid in reaction, and from dark gray to gray or light brownish gray in hues of 10YR to 2.5Y. This layer is mottled in shades of brown, strong brown, dark yellowish brown, or light yellowish brown.

The Btg horizon ranges from 29 to 64 inches in thickness, from very strongly acid to slightly acid in reaction, and from light brownish gray to gray or light olive gray in hues of 2.5Y and 5Y. This layer is mottled in shades of brown, yellow, gray, and red.

The C horizon ranges from sandy clay to clay in texture, from strongly acid to neutral in reaction, and from light gray to gray in hues of 10YR, 2.5Y, and 5Y. This layer is mottled in shades of yellow, brown, or olive.

Crowley fine sandy loam (Cw).—This soil occupies terraces and broad upland interstream divides. Slopes are generally less than 1 percent, but range up to 2 percent and are plane to slightly concave. Soil areas are irregular and are 10 to 170 acres in size.

Included with this soil in mapping are small areas of Susquehanna fine sandy loam and Wicksburg loamy fine sand. The more depressed parts of some soil areas have a clay loam surface layer. These included areas account for less than 5 percent of the total acreage.

Crowley fine sandy loam is used primarily for pine timber. A few cleared areas are in crops and pasture. The main crops are corn and forage crops. Common bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. (Capability unit IIIw-1; woodland suitability group 5; pastureland and hayland group 2; woodland grazing group 4)

Edna Series

The Edna series consists of nearly level, deep, poorly drained, loamy soils that have mottled clayey lower layers. These soils developed in clayey and loamy deposits on marine terraces.

In a representative profile, the surface layer is dark-gray fine sandy loam about 9 inches thick. Below this, to a depth of more than 63 inches, is gray clay. This clay is mottled with red in the upper part, strong brown in the middle, and yellowish brown in the lower part.

Edna soils have a moderately high available water capacity. They are used for pasture or crops.

Representative profile of Edna fine sandy loam in an area of Edna-Katy complex in a pasture 900 feet south of a road from a point 1.1 miles north and west of Farm Road 1488, which is 0.2 mile south and west of Farm Road 1774 at Magnolia, Tex.

Ap—0 to 5 inches, dark-gray (10YR 4/1) fine sandy loam; weak granular structure; very hard, friable; many fine pores and roots; few, very fine, weakly cemented ferromanganese concretions; strongly acid; clear, smooth boundary.

A12—5 to 9 inches, dark-gray (10YR 4/1) fine sandy loam; few, dark-brown mottles appearing only when soil is dry; structureless; very hard, friable; few, very fine, weakly cemented ferromanganese concretious; many grass roots; strongly acid; abrupt, wavy boundary.

B21tg—9 to 28 inches, gray (10YR 5/1) clay; many, fine, distinct, strong-brown mottles and a few, fine, prominent, red mottles; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; few, medium, siliceous pebbles; clay films on ped surfaces; strongly acid; gradual, wavy boundary.

B22tg—28 to 38 inches, gray (10YR 5/1) clay; common, fine and medium, distinct, strong-brown (7.5YR 5/6) mottles; weak, coarse, blocky structure; very hard, very firm, sticky and plastic; few, fine, weakly cemented ferromanganese concretions; few slickensides that do not intersect; medium acid; clear, wavy boundary.

B31tg—38 to 48 inches, dark-gray (10YR 4/1) clay; few, medium, distinct, yellowish-brown (10YR 5/6) mottles; weak, coarse, blocky structure; very hard, very firm, sticky and plastic; few, very fine, weakly cemented ferromanganese concretions; slightly acid; clear, smooth boundary.

B32tg—48 to 63 inches, gray (10YR 6/1) clay; few, fine, distinct, yellowish-brown mottles; weak, coarse, blocky structure; very hard, very firm; few, weakly cemented calcium carbonate concretions; few, fine, weakly cemented ferromanganese concretions; neutral.

The solum ranges from 50 to 100 inches in thickness. Slickensides range from few to common but do not intersect in any horizon.

The A horizon ranges from 3 to 10 inches in thickness, from very dark gray to light brownish gray in color, and from slightly acid to strongly acid in reaction.

The B2tg horizon ranges from 12 to 32 inches in thickness, from gray to light gray in color, and from slightly acid to strongly acid in reaction. In some areas this horizon is mottled in shades of red and brown.

The B3tg horizon is light gray to gray in hues of 10YR and 2.5Y, is slightly acid to mildly alkaline, and in some places contains yellowish-brown or strong-brown mottles.

Edna-Katy complex (Ek).—This mapping unit is a soil complex that consists of Katy soils on mounds 2 to 10 inches high and 50 to 300 feet long and of adjoining nearly level or slightly depressional areas of Edna soils. Edna soils make up about 70 percent of the acreage, and the Katy soils about 30 percent. The average slope of the complex is less than 0.3 percent.

The Edna soils have the profile described as representative of the Edna series.

Katy soils have a dark-brown surface layer of friable fine sandy loam about 20 inches thick. Below this is about 8 inches of yellowish-brown firm clay that has mottles of red and dark grayish brown. The next layer is mottled yellowish-brown, light brownish-gray, and red firm clay 18 inches thick. The substratum is light yellowish-brown firm clay mottled with yellowish red and light gray.

This mapping unit is used for crops and pasture. Corn and forage are the main crops. Common bermudagrass, dallisgrass, and common lespedeza are the principal introduced grasses. A few areas are in native bluestem. (Capability unit IIIw-1; woodland suitability group 5; pastureland and hayland group 2; woodland grazing group 4)

Eustis Series

The Eustis series consists of nearly level to undulating, deep, somewhat excessively drained, sandy soils. These soils occur on marine or stream terraces.

In a representative profile, the surface layer is dark-brown loamy fine sand about 6 inches thick. The subsurface layer is reddish-brown loamy fine sand about 11 inches thick. The next layer, to a depth of more than 63 inches, is yellowish-red loamy fine sand.

Eustis soils have a low available water capacity. These soils are used for pine timber. A small acreage is in crops and pasture.

Representative profile of Eustis loamy fine sand in a pasture 0.55 mile west of woods road from a point 1.8 miles south of Old Montgomery Road, which is 12.4 miles west of U.S. Highway 75 at Conroe, Tex.

Ap—0 to 6 inches, dark-brown (7.5YR 4/4) loamy fine sand; structureless; loose; slightly acid; clear, smooth boundary.

A2—6 to 17 inches, reddish-brown (5YR 4/4) loamy fine sand; structureless; very friable; medium acid; gradual, smooth boundary.

B2t—17 to 63 inches, yellowish-red (5YR 4/6) loamy fine sand; weak, medium, subangular blocky structure; very friable; sand grains are coated and bridged with clay; strongly acid.

The solum is 60 or more inches thick. The A horizon ranges from 13 to 39 inches in thickness; from reddish brown and yellowish red to dark brown in color, in hues of 5YR through 10YR; and from slightly acid to strongly acid in reaction.

The Bt horizon ranges from red to reddish yellow in hues of 2.5YR to 7.5YR, and from strongly acid to slightly acid. It has loamy sand to loamy fine sand texture and contains at least 3 percent more clay than the A horizon.

Eustis loamy fine sand (Eu).—This soil occupies both ridge crests and foot slopes. Slopes are mainly 0 to 5 percent, but range up to 7 percent, and are convex on ridge crests and concave on foot slopes. Soil areas are irregular and are from 10 to 100 acres in size.

Included with this soil in mapping are small areas of Blanton fine sand and Lucy loamy fine sand. These included areas comprise less than 10 percent of this soil.

Eustis loamy fine sand is used mainly for pine timber. A few cleared areas are in crops and pasture. The main crops are vegetables, corn, small grain, and forage. The primary pasture plants are common bermudagrass, Coastal bermudagrass, and common lespedeza. (Capability unit IIIs-2; woodland suitability group 6; pastureland and hayland group 7; woodland grazing group 3)

Ferris Series

The Ferris series consists of undulating to gently rolling, deep, somewhat excessively drained, clayey soils. These soils developed in clayey deposits on marine or stream terraces.

In a representative profile, the surface layer is very dark grayish-brown clay about 6 inches thick. The lower layers are about 43 inches of olive clay, which overlies about 14 inches of light-gray clay that contains brownish-yellow mottles.

Ferris soils have a moderately high available water capacity. These soils are used for pasture, and a few areas are in crops.

Representative profile of Ferris clay, 1 to 5 percent slopes, eroded, in a pasture 125 feet north of Texas Highway 105 from a point 13.4 miles west of U.S. Highway 75 at Conroe, Tex.

Ap—0 to 6 inches, very dark grayish-brown (2.5Y 3/2) clay; strong, very fine and fine, blocky structure; very hard, firm, sticky and plastic; common, fine, weakly cemented calcium carbonate concretions; moderately alkaline; calcareous; clear, smooth boundary.

AC—6 to 49 inches, olive (5Y 5/3) clay; moderate, fine and medium, blocky structure; very hard, firm, sticky and plastic; few to common, medium to coarse, weakly cemented calcium carbonate concretions; few, coarse slickensides that intersect, pressure faces of slickensides are shiny; moderately alkaline; calcareous; gradual, smooth boundary.

C—49 to 63 inches, light-gray (2.5Y 7/2) clay; common to many, medium, distinct, brownish-yellow (10YR 6/6) mottles; massive; very hard, firm, sticky and plastic; few slickensides and pressure faces; many, fine to coarse, weakly to strongly cemented calcium carbonate concretions; moderately alkaline; calcareous.

The solum ranges from 40 to 65 inches in thickness. Cracks, extending to more than 20 inches below the surface, remain open for 90 to 150 cumulative days in most years.

The Ap horizon ranges from 4 to 7 inches in thickness and from grayish brown to very dark grayish brown in color in hues of 10YR and 2.5Y.

The AC horizon ranges from 36 to 60 inches in thickness and from brown to olive yellow in hues of 10YR, 2.5Y, and 5Y.

The C horizon is white to light gray or olive in hues of 10YR, 2.5Y, and 5Y and contains few to many calcium carbonate concretions up to 1 inch in diameter.

Ferris clay, 1 to 5 percent slopes, eroded (FcC2).—This soil occupies the breaks to the drainageways and the drainheads. Slopes are plane to convex and are dominantly 2 to 5 percent. Areas are irregular to elongated and 10 to 100 acres in size.

This soil has the profile described as representative for the series.

Gullies 6 to 18 inches deep occur at midslope. These are flattened, about 10 to 30 feet wide, and 50 to 200 feet apart. A few gullies too deep to cross with farm equipment are in the drainheads.

Mapped with this soil are small areas of Ferris clay, 5 to 8 percent slopes, eroded. These included areas comprise less than 10 percent of the total acreage.

Ferris clay, 1 to 5 percent slopes, eroded, was in cultivation at one time, but now is used for pasture. Native plants include three-awn, snow-on-the-prairie, and hairy tridens. (Capability unit IVe-2; pastureland and hayland group 8)

Ferris clay, 5 to 8 percent slopes, eroded (FcD2).—This soil occupies the breaks along natural drains in prairie areas. Areas are elongated and are 10 to 200 acres in size.

The surface layer is grayish-brown clay 5 inches thick. Sheet erosion has removed much of the surface. The next layer is light yellowish-brown, moderately alkaline clay. Below this is moderately alkaline, olive clay that contains calcium carbonate concretions up to 1 inch in diameter.

There are gullies 12 to 24 inches deep, mostly at midslope. These gullies are 20 to 40 feet wide and 50 to 150 feet apart. A few gullies too deep to cross with farm equipment are in the drainheads.

Ferris clay, 5 to 8 percent slopes, eroded, was at one time in cultivation but is now used for pasture. Soil areas have a cover of three-awn, snow-on-the-prairie, and hairy tridens. (Capability unit VIe-3; pastureland and hayland group 8)

Ferris-Gullied land complex, 3 to 8 percent slopes (FgD).—This mapping unit occupies areas that slope toward drainageways in the upland prairies. The areas are elongated and are 10 to 200 acres in size.

Ferris soils comprise about 80 percent of the acreage. Their surface layer is moderately alkaline, gray clay 3 inches thick. The next layer is moderately alkaline, olive-yellow clay. Below this is moderately alkaline, light yellowish-brown clay that has a few, faint, yellow mottles.

Many gullies, 12 to 24 inches deep and from 10 to 50 feet or more wide, occur throughout the area. These make up about 20 percent of the acreage. There are several gullies per acre that are too deep to cross with farm equipment.

The areas of this mapping unit are used for pasture. They have a cover of hairy tridens, snow-on-the-prairie, three-awn, and other annual weeds and grasses. (Capability unit VIe-3; pastureland and hayland group 8)

Fuquay Series

The Fuquay series consists of nearly level to gently sloping, deep, well-drained soils that are sandy to a depth of 20 to 38 inches and have loamy lower layers. These soils developed in loamy deposits on marine or stream terraces.

In a representative profile, the surface layer is brown loamy fine sand about 4 inches thick. The subsurface layer is pale-brown loamy fine sand about 19 inches thick. The next layers, to a depth of 67 inches, are yellowish-brown sandy clay loam mottled in shades of yellowish red in the upper part and light gray and red in the lower part.

Fuquay soils have a moderate available water capacity. These soils are used for pine timber, and a small acreage is in crops and pasture.

Representative profile of Fuquay loamy fine sand in a timbered area 75 feet west of a road in W. Goodrich Jones State Forest, from a point 0.25 mile south of Farm Road 1488, which is 1.3 miles west of Interstate 45, and 5.6 miles south of Texas Highway 105 at Conroe, Tex.

A1—0 to 4 inches, brown (10YR 4/3) loamy fine sand; weak, granular structure; loose, very friable; many tree roots; medium acid; clear, smooth boundary.

A2—4 to 23 inches, pale-brown (10YR 6/3) loamy fine sand; structureless; hard, very friable; many tree roots; few, fine to coarse, indurated ironstone concretions; strongly acid; clear, wavy boundary.

B21t—23 to 39 inches, yellowish-brown (10YR 5/6) sandy clay loam; few, medium, distinct, yellowish-red (5YR 5/6) mottles; moderate, medium, subangular blocky structure; very hard, friable; many, fine and medium pores; patchy clay films; few tree roots; few, fine and medium, indurated ironstone concretions; very strongly acid; clear, wavy boundary.

B22t—39 to 48 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, distinct, yellowish-red (5YR 5/6) mottles; few, medium, prominent, red (2.5YR 4/8) mottles; fine, light-gray (10YR 6/1) mottles; some of the red mottles are in the soft concretionary formation stage; moderate, medium, subangular blocky structure; hard, friable; patchy clay films; common, fine and medium pores and few large pores; 10 percent plinthite; very strongly acid; clear, smooth boundary.

B23t—48 to 67 inches, yellowish-brown (10YR 5/8) sandy clay loam; many, coarse, prominent, red (10R 4/8) mottles and common, fine, distinct, light-gray mottles; weak to moderate, medium, subangular blocky structure; hard, friable; patchy clay films; 15 percent plinthite; very strongly acid; clear, smooth boundary.

B3t—67 to 80 inches, mottled light-gray (10YR 6/1), red (10R 4/8), and reddish-yellow (7.5YR 6/8) sandy clay loam; weak blocky structure; very hard, firm; small pockets of white silt; very strongly acid.

The solum ranges from 60 to 100 inches in thickness. The A horizon ranges from 20 to 38 inches in thickness, from light brownish gray to pale brown in color, and from slightly acid to very strongly acid in reaction. In places the lower part of the A horizon has a few brown or yellowish-brown mottles.

The B21t horizon ranges from 8 to 16 inches in thickness, from brownish yellow to yellowish brown in color, and from strongly acid to very strongly acid in reaction. A few red or reddish-yellow mottles are present in places.

The combined B22t and B23t horizons range from 22 to 30 inches in thickness, from brownish yellow to yellowish brown in color, and from strongly acid to very strongly acid in reaction. Mottles of red, brown, gray, and yellow are evident in this layer. The plinthite content ranges from 10 to 25 percent.

The B3t horizon is mottled in shades of brown, yellow, red, or gray.

Fuquay loamy fine sand (Fs).—This soil has mainly slightly convex slopes of 0 to 3 percent, but some slopes range to 5 percent. Areas are irregular and are 10 to 200 acres in size.

This soil has the profile described as representative for the series.

Included with this soil in mapping are small areas of Splendora fine sandy loam, Sorter silt loam, and Waller loam. These included areas comprise less than 10 percent of the total acreage.

Fuquay loamy fine sand is used primarily for pine timber. A few areas have been cleared for crops and pasture. Vegetables, corn, and forage are the main crops. Coastal bermudagrass, common bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. (Capability unit IIs-2; woodland suitability group 7; pastureland and hayland group 1; woodland grazing group 3)

Fuquay loamy fine sand, terrace (Ft).—This nearly level to slightly convex soil occupies low stream terraces and has slopes of less than 1 percent. Soil areas are elongated and are 10 to 650 acres in size.

The surface layer is pale-brown loamy fine sand 25 inches thick. The next layer is brownish-yellow sandy clay loam that has red and reddish-yellow mottles. Lower layers are sandy clay loam mottled in shades of gray, red, yellow, and brown. These lower layers are 10 to 20 percent plinthite.

Included with this soil in mapping are small areas of Lucy loamy fine sand. These included areas account for less than 10 percent of the total acreage.

Fuquay loamy fine sand, terrace, is used mainly for pine timber. A few areas are used for crops and pasture. Corn, vegetables, small grain, and forage are the principal crops. Coastal bermudagrass, common bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the main pasture plants. (Capability unit IIs–2; woodland suitability group 11; pastureland and hayland group 1; woodland grazing group 3)

Garner Series

The Garner series consists of nearly level to gently sloping, deep, somewhat poorly to poorly drained, clayey soils. These soils developed in clayey deposits on marine and stream terraces.

In a representative profile, the surface layer is dark-gray clay about 5 inches thick. The next layers, to a depth of more than 60 inches, are gray clay that has brownish-yellow mottles in the lower part.

Garner soils have a moderately high available water capacity. These soils are used for crops, pasture, and timber (fig. 7).

Representative profile of Garner clay in a pasture 1,000 feet south of a house located 0.3 mile south of a county road from a point 0.6 mile west and 2.5 miles north of a road "T" which is 0.8 mile west of U.S. Highway 75 on Shepard Hill Road, and 2.25 miles south of the Walker-Montgomery County line.

Ap—0 to 5 inches, dark-gray (10YR 4/1) clay; moderate, fine, blocky structure; hard, firm, sticky and plastic; slightly acid; abrupt, wavy boundary.

A12—5 to 18 inches, gray (10YR 5/1) clay; few, fine, faint, yellow mottles; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; few, medium, soft ferromanganese concretions; medium acid; clear, wavy boundary.

AC—18 to 40 inches, gray (10YR 5/1) clay; few, fine, faint, yellow mottles; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; distinct parallelepipeds that have their long axis titled about 20 to 30 degrees from horizontal; contains many intersecting slickensides; few, very fine, weakly cemented ferromanganese concretions; medium acid; clear, wavy boundary.

C—40 to 60 inches, gray (10YR 6/1) clay; common, medium, distinct, brownish-yellow (10YR 6/6) mottles; moderate, medium, blocky structure; very hard, very firm, sticky and plastic; distinct parallelepipeds that have their long axis tilted about 20 to 30 degrees from horizontal; contains many intersecting slickensides;

Figure 7.—**Timber on a typical area of Garner clay.**

few, fine and medium, weakly cemented calcium carbonate concretions; neutral.

Intersecting slickensides begin at depths ranging from 20 to 30 inches below the surface. Gilgai relief consists of knolls 3 to 10 feet in diameter and 3 to 10 inches higher than the depressions.

The A horizon ranges from 1 to 28 inches in thickness, from dark gray to gray in color, and from medium acid to mildly alkaline in reaction. The A horizon is thicker in the microdepressions.

The AC horizon ranges from 11 to 26 inches in thickness, and from gray to light gray in hues of 10YR and 2.5Y. It has few to common mottles in shades of yellow, brownish yellow, or reddish yellow. Reaction of the AC horizon ranges from medium acid to mildly alkaline.

The C horizon ranges from gray to light gray, in hues of 10YR to 2.5Y, and has common to many brownish-yellow, light yellowish-brown, or reddish-yellow mottles.

Garner clay (Ga).—This soil is level to slightly convex. Slopes are dominantly between 0.5 and 1.5 percent but range up to 3 percent. Soil areas are irregular and are 10 to 85 acres in size.

Included with this soil in mapping are small areas of Kipling clay loam and Burleson clay. These included areas comprise less than 10 percent of the total acreage.

Garner clay is used for crops, pasture, and timber. Cotton, corn, small grain, grain sorghum, and forage are the main crops. Common bermudagrass, dallisgrass, burclover, and common lespedeza are the principal pasture plants. (Capability unit IIIw–2; woodland suitability group 10; pastureland and hayland group 8; woodland grazing group 5)

Gunter Series

The Gunter series consists of nearly level to gently sloping, deep, well-drained soils that are sandy to a depth of 40 to 60 inches and have loamy lower layers containing plinthite. These soils are on marine terraces.

In a representative profile, the surface layer is very dark grayish-brown fine sand about 5 inches thick. The subsurface layers are light yellowish-brown fine sand 26 inches thick underlain by very pale brown fine sand 15 inches thick. The next layer is yellowish-brown sandy loam 11 inches thick underlain by mottled red and yellowish-brown sandy clay loam 18 inches thick.

Gunter soils have a low available water capacity. They are used for timber. Suburban developments have been built in a few areas.

Representative profile of Gunter fine sand in a timbered area 100 feet south of a county road from a point 4.3 miles east of Farm Road 1097, which is 4.6 miles northeast of U.S. Highway 75 at Willis, Tex.

A1—0 to 5 inches, very dark grayish-brown (10YR 3/2) fine sand; structureless; loose, very friable; medium acid; clear, wavy boundary.

A21—5 to 31 inches, light yellowish-brown (10YR 6/4) fine sand; few, medium, distinct, brown mottles; structureless; loose; few, fine and medium, indurated ironstone and chert pebbles; strongly acid; clear, wavy boundary.

A22—31 to 46 inches, very pale brown (10YR 7/4) fine sand; common, coarse, distinct, brown (7.5YR 5/4) mottles that are slightly harder than the surrounding mass; structureless; slightly brittle, loose; few, fine and medium, indurated ironstone and chert pebbles; very strongly acid; clear, wavy boundary.

B1t—46 to 57 inches, yellowish-brown (10YR 5/6) sandy loam; common, medium, distinct, yellowish-red (5YR 5/6) mottles of loam material that is slightly brittle; structureless; hard, friable; few, fine and medium, indurated ironstone and chert pebbles; very strongly acid; gradual, wavy boundary.

B2t—57 to 75 inches, reticulately mottled red (10R 4/6) and yellowish-brown (10YR 5/6) sandy clay loam; few, prominent, light-gray (10YR 6/1) mottles; weak blocky structure; brittle or cemented; patchy clay films; 40 percent plinthite that is red surrounded by yellowish brown; few, medium, indurated ironstone concretions; very strongly acid.

The solum ranges from 60 to more than 100 inches in thickness. Depth to horizons containing plinthite ranges from 45 to 60 inches.

The A1 horizon ranges from 3 to 6 inches in thickness and from very dark grayish brown to light brownish gray in color.

The combined A21 and A22 horizons range from 37 to 54 inches in thickness, from pale brown to very pale brown or light yellowish brown in color, and from fine sand to loamy sand in texture. They have few to common brown, yellowish-red, or red mottles.

The B1t horizon ranges from 10 to 12 inches in thickness, from light yellowish brown to brownish yellow or yellowish brown in color, and from loamy sand to fine sandy loam in texture. This horizon has reddish-yellow to yellowish-red mottles.

The B2t horizon is reticulately mottled in shades of red, brown, yellow, or gray and ranges from sandy loam to sandy clay loam. Plinthite content of this horizon is 35 to 50 percent.

Gunter fine sand (Gu).—This soil is nearly level to gently sloping. It has a dominant slope range of 0 to 5 percent, but in places slope ranges up to 8 percent. The areas are elongated and from 10 to 200 acres in size.

Included with this soil in mapping are small areas of Conroe loamy fine sand. These included areas comprise less than 10 percent of the total acreage.

Gunter fine sand is used mainly for pine timber. Suburban developments have been built in a few areas. (Capability unit IVs–1; woodland suitability group 6; pastureland and hayland group 7; woodland grazing group 3)

Hockley Series

The Hockley series consists of nearly level to gently sloping, deep, moderately well to well drained, loamy soils that have lower layers containing plinthite. These soils developed in loamy deposits of marine or stream terraces.

In a representative profile, the surface layer is dark grayish-brown fine sandy loam about 23 inches thick. The subsurface layer is brown fine sandy loam 9 inches thick. Lower layers, to a depth of more than 63 inches, are sandy clay loam. They are yellowish brown mottled with strong brown and red in the upper part, and are mottled strong brown, light gray, and red in the lower part.

Hockley soils have a moderate available water capacity. They are used for crops, and a small acreage is in pasture.

Representative profile of Hockley fine sandy loam in a pasture 0.3 mile south of a county road from a point 1.5 miles southwest of Farm Road 149 at Decker Prairie, Tex.

A1—0 to 23 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak to moderate, fine and very fine, granular structure; hard, friable; many grass roots; medium acid; gradual, smooth boundary.

A2—23 to 32 inches, brown (10YR 5/3) fine sandy loam; common, medium, faint, dark grayish-brown (10YR 4/2) mottles; weak, fine, subangular blocky structure; hard, friable; few, fine and medium, indurated ironstone concretions; strongly acid; clear, smooth boundary.

B21t—32 to 43 inches, yellowish-brown (10YR 5/4) sandy clay loam; many, medium, distinct, strong-brown (7.5YR 5/6) mottles; moderate, medium, subangular blocky structure; hard, friable; patchy clay films on peds; few, fine and medium, indurated ironstone concretions; strongly acid; clear, smooth boundary.

B22t—43 to 55 inches, yellowish-brown (10YR 5/4) sandy clay loam; many, medium, distinct, strong-brown (7.5YR 5/6) and prominent, red (2.5YR 4/8) mottles; weak to moderate, medium, subangular blocky structure; hard, friable; few, fine and medium, indurated ironstone concretions; 20 percent plinthite; patchy clay films on ped surfaces; strongly acid; clear, smooth boundary.

B3t—55 to 63 inches, mottled strong-brown (7.5YR 5/6), light-gray (10YR 6/1), and red (10R 4/8) sandy clay loam; weak, medium, subangular blocky structure; hard, friable; few, fine to coarse, indurated ironstone concretions; 20 percent plinthite; strongly acid.

The solum ranges from 70 to 120 inches in thickness. Depth to horizons containing more than 10 percent plinthite ranges from 35 to 60 inches.

The A horizon ranges from 20 to 35 inches in thickness and from dark grayish brown to brown or pale brown in color. The lower part in places has dark yellowish-brown to strong-brown or dark grayish-brown mottles.

The B21t horizon ranges from 6 to 20 inches in thickness and from light yellowish brown to yellowish brown or brownish yellow in color. It is mottled with strong brown, yellowish red, or red.

The B22t horizon ranges from 10 to 14 inches in thickness. It is light yellowish brown to yellowish brown, mottled in shades of red or strong brown. From 10 to 25 percent of this horizon is plinthite.

Hockley fine sandy loam (Ho).—This soil has plane to slightly convex slopes that are generally 0.3 to 2.0 percent. In places, however, slopes range up to 3 percent. Soil areas are round to elongated and are 25 to 150 acres in size.

Mapped with this soil are small areas of Katy fine sandy loam. These included areas make up less than 10 percent of the total acreage.

Hockley fine sandy loam is used primarily for growing vegetables, corn, small grain, and forage crops. A few small areas are in pasture. The principal pasture plants are Coastal bermudagrass, common bermudagrass, dallisgrass, carpetgrass, and common lespedeza. (Capability unit IIe-2; woodland suitability group 4; pastureland and hayland group 9; woodland grazing group 3)

Houston Black Series

The Houston Black series consists of nearly level to gently sloping, moderately well drained, calcareous, clayey soils. These soils developed in clayey deposits on marine or stream terraces. They are characterized by microrelief highs and lows. The microlows are more extensive than the microhighs.

In a representative profile the surface layer is black clay about 6 inches thick. The next layers are black clay. They extend to a depth of about 46 inches and are underlain by about 14 inches of dark-gray clay.

Houston Black soils have a moderately high available water capacity. These soils are used for crops and pasture.

Representative profile of Houston Black clay in a meadow 1,200 feet north of a county road from a point 1.2 miles west of U.S. Highway 75, which is 1.8 miles south of the Montgomery-Walker County line.

Microlow.

A1p—0 to 6 inches, black (10YR 2/1) clay; moderate, fine, blocky structure; very hard, firm, sticky and plastic; few, very fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous; clear, wavy boundary.

A12—6 to 30 inches, black (10YR 2/1) clay; strong, fine and very fine, blocky structure; very hard, firm, sticky and plastic; peds have shiny pressure faces; few, very fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous; gradual, wavy boundary.

A13—30 to 46 inches, black (N 2/0) clay; moderate, coarse, blocky structure; very hard, firm, sticky and plastic; contains many slickensides that intersect; few, fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous; clear, wavy boundary.

AC—46 to 60 inches, dark-gray (5Y 4/1) clay; moderate, coarse, blocky structure; very hard, firm, sticky and plastic; contains many slickensides that intersect; moderately alkaline; calcareous.

Microhigh.

A1p—0 to 6 inches, very dark gray (10YR 3/1) clay; moderate, fine and medium, blocky structure; very hard, firm, sticky and plastic; few, very fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous; clear, smooth boundary.

A12—6 to 22 inches, black (N 2/0) clay; strong, fine and very fine, blocky structure; very hard, firm, sticky and plastic; peds have shiny pressure faces; few, very fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous; clear, smooth boundary.

AC1—22 to 35 inches, dark-gray (5Y 4/1) clay; moderate, medium, blocky structure; very hard, firm, sticky and plastic; contains many slickensides that intersect; few to common, very fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous; gradual, wavy boundary.

AC2—35 to 45 inches, dark-gray (5Y 4/1) clay; few to common, fine, distinct, grayish-brown mottles; moderate, coarse, blocky structure; very hard, firm, sticky and plastic; contains many intersecting slickensides; many, very fine to medium, weakly cemented calcium carbonate concretions; moderately alkaline; calcareous; gradual, wavy boundary.

C—45 to 60 inches, olive (5Y 5/3) clay; many, fine, prominent, yellowish-red mottles; weak, coarse, blocky structure; very hard, firm, sticky and plastic; contains many intersecting slickensides; common, fine and medium, weakly cemented calcium carbonate concretions; moderately alkaline.

This soil has cracks extending more than 20 inches below the surface that open and close in most years. Where the soil has not been tilled, it has weak gilgai relief. The microhighs are 2 to 4 inches higher than the microlows. Distance between the microhighs is from 10 to 21 feet.

The A horizon is more than 30 inches thick in more than 50 percent of the areas. It is black to very dark gray in hues of 10YR, 2.5Y, and 5Y and has a chroma of less than 1.5.

The AC horizon ranges from 12 to 30 inches in thickness and from dark-gray to gray in hues of 10YR to 5Y.

The C horizon ranges from gray to pale olive or olive in hues of 10YR, 2.5Y, and 5Y and has yellowish-red, light olive-brown, or yellow mottles.

Houston Black clay (Hs).—This nearly level to gently sloping soil occupies convex ridgetops. The dominant range in slope is 0.5 to 3 percent but in places the slope is as much as 5 percent. Soil areas are irregular and are 10 to 70 acres in size.

Included with this soil in mapping are small areas of Ferris clay, 1 to 5 percent slopes, eroded, on the slope breaks and at the heads of drainageways and also small areas of Burleson clay. These included areas comprise less than 5 percent of the total acreage.

Houston Black clay is used for crops and pasture. Cotton, corn, small grain, grain sorghum, and forage are the main crops. Dallisgrass, common bermudagrass, and common lespedeza are the principal pasture plants. (Capability unit IIe-1; woodland suitability group 10; pastureland and hayland group 8; woodland grazing group 5)

Katy Series

The Katy series consists of nearly level to gently sloping, deep, somewhat poorly drained, loamy soils that have mottled clayey lower layers. These soils developed in loamy and clayey terrace deposits.

In a representative profile, the surface layer is dark-brown fine sandy loam about 5 inches thick. The subsurface layer is brown fine sandy loam about 29 inches thick that has light-brown and light-gray mottles in the lower 11 inches. Lower layers are mottled reddish-yellow, gray, red, and brownish-yellow clay.

Katy soils have a moderate available water capacity. They are used for crops or pasture.

Representative profile of Katy fine sandy loam in a pasture 350 feet northwest of a county road from a point 0.5 miles west of Farm Road 1488, which is 0.2 miles southwest of Farm Road 1774 at Magnolia, Tex.

AP—0 to 5 inches, dark-brown (10YR 3/3) fine sandy loam; weak, granular structure; friable; many grass roots; strongly acid; clear, smooth boundary.

A21—5 to 23 inches, brown (10YR 4/3) fine sandy loam; structureless; friable; few grass roots; few, very fine, indurated ironstone concretions; very strongly acid; clear, smooth boundary.

A22—23 to 34 inches, brown (10YR 5/3) fine sandy loam; few, medium, distinct, yellowish-brown (10YR 5/6) and light-gray (10YR 7/1) mottles; structureless; friable; few grass roots; few, medium, indurated ironstone concretions; strongly acid; abrupt, wavy boundary.

B2t—34 to 47 inches, mottled reddish-yellow (7.5YR 6/8), gray (10YR 5/1), and red (10R 4/8) clay; moderate, medium, blocky structure; very hard, very firm, sticky and plastic; clay films on ped surfaces; few, fine to coarse, indurated ironstone concretions and siliceous pebbles; slightly acid; clear, smooth boundary.

B3t—47 to 63 inches, mottled light-gray (10YR 6/1), brownish-yellow (10YR 6/6), and red (10R 4/8) clay; weak, medium, blocky structure; very hard, very firm, sticky and plastic; patchy clay films on ped surfaces; few, medium, indurated ironstone concretions and siliceous pebbles; slightly acid.

The solum is more than 50 inches thick. The A horizon ranges from 20 to 40 inches in thickness, from dark brown to pale brown in color in hues of 7.5YR and 10YR, and from medium to very strongly acid in reaction. The lower part of this horizon has mottles of light gray and dark brown, yellowish brown, or strong brown.

The Bt horizon is mottled in shades of gray, yellow, brown, and red and is medium to slightly acid in reaction.

Katy fine sandy loam (Ka).—This nearly level to gently sloping soil occurs on convex ridges. Slopes are dominantly 0.5 to 2.0 percent, but range up to 4 percent. Soil areas are irregular and are 10 to 180 acres in size.

Included with this soil in mapping are small areas of Edna soils and Hockley fine sandy loam. These included areas comprise less than 10 percent of the total acreage.

Katy fine sandy loam is used for crops and pasture. Vegetables, corn, small grain, and forage are the main crops. Coastal bermudagrass, common bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. (Capability unit IIw-3; woodland suitability group 5; pastureland and hayland group 9; woodland grazing group 4)

Kaufman Series

The Kaufman series consists of nearly level, deep, somewhat poorly drained, noncalcareous, clayey soils. These soils are on flood plains.

In a representative profile, the surface layer is black clay about 10 inches thick. The next layers are black clay about 39 inches thick, underlain by 14 inches of very dark gray clay.

Kaufman soils have a moderately high available water capacity. These soils are used for hardwood timber, and a small acreage is in pasture.

Representative profile of Kaufman clay, frequently flooded, in a timbered area 2,100 feet south of Dacus Road from a point 3.0 miles west and south of the intersection of Forest Road 211 and Farm Road 1097, which is 5.1 miles south of the intersection of Farm Road 149 and Farm Road 1791.

A11—0 to 10 inches, black (10YR 2/1) clay; moderate, medium, blocky structure; very hard, very firm, sticky and plastic; many tree and grass roots; slightly acid; clear, smooth boundary.

A12—10 to 33 inches, black (N 2/0) clay; strong, fine and medium, blocky structure; very hard, very firm, very sticky and plastic; shiny pressure faces on some peds; many tree and grass roots; mildly alkaline; clear, smooth boundary.

A13—33 to 49 inches, black (10YR 2/1) clay; weak, medium, blocky structure; very hard, very firm, very sticky and plastic; common nonintersecting slickensides; shiny pressure faces on ped surfaces; few, fine roots; moderately alkaline; calcareous; clear, smooth boundary.

C—49 to 63 inches, very dark gray (10YR 3/1) clay; massive; very hard, very firm, very sticky and plastic; few, fine, weakly cemented calcium carbonate concretions; moderately alkaline; calcareous.

This soil ranges from 40 to 100 inches in thickness. The A horizon ranges from 24 to 50 inches in thickness and has hues of 10YR and 2.5Y. The A11 part of the A horizon ranges from slightly acid to neutral in reaction, and the A12 and A13 parts range from neutral to moderately alkaline.

The C horizon is dark gray to very dark gray and is neutral to moderately alkaline.

Kaufman clay, frequently flooded (Kc).—This soil occupies the flood plain of streams and has a slope of less than 1 percent. It is subject to frequent overflows. Soil areas are irregular and are 20 to 400 acres in size.

Included with this soil in mapping are small areas of Trinity, Kosse, and Tuscumbia soils. These included areas make up less than 15 percent of the total acreage.

Most areas of Kaufman clay, frequently flooded, are used for hardwood timber. A few cleared areas are in pasture. Dallisgrass, common bermudagrass, burclover, and common lespedeza are the principal pasture plants. (Capability unit Vw-1; woodland suitability group 9; pastureland and hayland group 5; woodland grazing group 1)

Kipling Series

The Kipling series consists of nearly level to gently sloping, deep, somewhat poorly drained, loamy soils that have clayey lower layers. These soils developed in clayey deposits on stream or marine terraces.

In a representative profile, the surface layer is dark-brown clay loam about 7 inches thick. The lower layers, in sequence, are the following: about 7 inches of yellowish-red clay; 9 inches of mottled light reddish-brown, red, and light-gray clay; 19 inches of mottled light yellowish-brown, light-gray, and yellowish-red clay; and 8 inches of light olive-brown clay.

Kipling soils have a moderately high available water capacity. These soils are used for pasture, and a small acreage is tilled.

Representative profile of Kipling clay loam in an area of Kipling soils, 0 to 1 percent slopes, in an abandoned field 550 feet south of a county road from a point 1.1 miles south and west of Texas Highway 105, which is 1.1 miles west of Farm Road 149 at Montgomery, Tex.

Ap—0 to 7 inches, dark-brown (7.5YR 4/2) clay loam; weak, subangular blocky structure; very hard, friable; few, fine, strongly cemented ferromanganese concretions; slightly acid; abrupt, smooth boundary.

B21t—7 to 14 inches, yellowish-red (5YR 4/6) clay; few, medium, distinct, light yellowish-brown (10YR 6/4) mottles; moderate, fine, angular and subangular blocky structure; very hard, very firm, very sticky and plastic; clay film on ped surfaces; common fine pores; few, fine, strongly cemented ferromanganese concretions; medium acid; clear, wavy boundary.

B22t—14 to 23 inches, mottled light yellowish-brown (10YR 6/4), red (10R 5/6), and light-gray (N 7/0) clay; moderate, fine, blocky structure; very hard, very firm, very sticky and plastic; clay films on ped surfaces; common fine pores; strongly acid; gradual, wavy boundary.

B23t—23 to 42 inches, mottled light yellowish-brown (2.5Y 6/3), light-gray (N 7/0), and yellowish-red (5YR 5/8) clay; moderate, fine, blocky structure; very hard, very firm, very sticky and plastic; clay films or pressure faces on ped surfaces; contains few nonintersecting slickensides; few, fine, strongly cemented ferromanganese concretions; medium acid; gradual, smooth boundary.

C—42 to 50 inches, light olive-brown (2.5Y 5/4) clay; weak, blocky structure; very hard, firm; mildly alkaline; noncalcareous in the matrix, but contains a few weakly and strongly cemented calcium carbonate concretions.

The Ap horizon ranges from 4 to 10 inches in thickness, from grayish brown to dark brown in hues of 7.5YR and 10YR, and from clay loam to fine sandy loam in texture.

The Bt horizon ranges from yellowish red and yellowish brown to gray and is mottled in shades of brown, gray, and red. Grayish mottles that have chromas of 2 or less occur within 10 inches of the top of the Bt horizon. The Bt horizon ranges from 40 to 50 percent clay.

The C horizon is light olive brown to light gray. It contains few to common weakly and strongly cemented calcium carbonate concretions.

Kipling fine sandy loam, 1 to 3 percent slopes (KlB).—This gently sloping soil occupies convex ridgetops. Soil areas are irregular and from 10 to 100 acres in size.

The surface or plow layer is dark-brown, friable fine sandy loam about 7 inches thick. The next layer is yellowish-red clay containing gray mottles. Below this is mottled olive-yellow, gray, or light olive-brown clay.

Included with this soil in mapping are small areas of Kipling clay loam, Burleson clay, and Garner clay. These included areas comprise less than 10 percent of the total acreage.

Most areas of Kipling fine sandy loam have been in cultivation, but are now in pasture. Only a few areas are in crops. Common bermudagrass, dallisgrass, and common lespedeza are the principal pasture plants. Cotton, corn, small grain, grain sorghum, and forage are the main crops. (Capability unit IIIe-1; woodland suitability group 10; pastureland and hayland group 11; woodland grazing group 5)

Kipling soils, 0 to 1 percent slopes (KnA).—These soils occupy broad interstream divides. Slopes are dominantly 0.2 to 1.0 percent, and runoff is slow. Soil areas are irregular and are 10 to 60 acres in size.

Kipling clay loam makes up 52 percent of the acreage. This soil has the profile described as representative for the series.

Kipling fine sandy loam makes up 44 percent of the acreage. It has a surface layer of dark-brown, friable fine sandy loam about 7 inches thick. The next layer is yellowish-red, very firm clay that is mottled in shades of brown and gray. Below this is clay mottled in shades of gray, yellow, and olive. The substratum is light olive-brown to light-gray, firm clay that has common olive-yellow mottles. Any given area generally consists of either a clay loam or a fine sandy loam, rather than some of each.

Included with these soils in mapping are small areas of Burleson clay and Garner clay. These included areas make up less than 4 percent of the total acreage.

Most areas of Kipling soils, 0 to 1 percent slopes, were formerly cultivated. All but a few small areas are now in pasture. Primary pasture plants are common bermudagrass, dallisgrass, and common lespedeza. Cotton, corn, grain sorghum, small grain, and forage are the principal crops. (Capability unit IIw-4; woodland suitability group 10; pastureland and hayland group 11; woodland grazing group 5)

Kipling clay loam, 1 to 3 percent slopes (KpB).—Soil areas are irregular and are 10 to 100 acres in size.

The surface or plow layer is dark-brown clay loam about 6 inches thick. The next layer is yellowish-red clay that has light yellowish-brown mottles. The next lower layer is clay that is mottled in shades of brown, red, and gray. The underlying material is light olive-brown clay containing concretions of lime.

Included with this soil in mapping are small areas of Burleson clay and Garner clay. In a few places the texture of the surface layer is fine sandy loam. These included areas comprise less than 10 percent of the total acreage.

Most areas of Kipling clay loam, 1 to 3 percent slopes, have been in cultivation but are now in pasture. Only a few small areas are in crops. The principal pasture plants are common bermudagrass, dallisgrass, and common lespedeza. The main crops are corn, cotton, small grain, grain sorghum, and forage. (Capability unit IIIe-1; woodland suitability group 10; pastureland and hayland group 11; woodland grazing group 5)

Kosse Series

The Kosse series consists of nearly level, deep, somewhat poorly drained, loamy soils. These soils occur on the flood plain of streams.

In a representative profile, the surface layer is very dark grayish-brown clay loam about 18 inches thick. The next layer is mottled dark grayish-brown, dark-gray, and yellowish-brown clay loam about 14 inches thick. It is underlain by about 16 inches of gray clay loam that contains dark yellowish-brown mottles.

Kosse soils have a moderate available water capacity. They are used for hardwood timber, and a few areas are in pasture.

Representative profile of Kosse clay loam in an area of Kosse soils in a pasture 500 feet west of Dacus Road from a point 2.4 miles west and south of the intersection of Forest Road 211 and Farm Road 1097, which is 5.1 miles south of the intersection of Farm Road 149 and Farm Road 1791.

A1—0 to 18 inches, very dark grayish-brown (10YR 3/2) clay loam; moderate, medium, subangular blocky structure and weak, granular structure; hard, friable; few worm casts; few, fine, weakly cemented ferromanganese concretions; slightly acid; gradual, wavy boundary.

B—18 to 32 inches, faintly and finely mottled dark grayish-brown (10YR 4/2) and dark-gray (10YR 4/1) clay loam; few, fine, faint mottles of brown and dark yellowish brown; weak, subangular blocky structure; hard, friable; few, fine, weakly cemented ferromanganese concretions; slightly acid; gradual, smooth boundary.

Cg—32 to 48 inches, gray (10YR 6/1) clay loam; many, medium and coarse, dark yellowish-brown (10YR 4/4) mottles; structureless; hard, friable; few, fine, weakly cemented ferromanganese concretions; few lenses of clay, silt, and sand; medium acid.

The A horizon ranges from 10 to 20 inches in thickness, from very dark grayish brown to very dark gray in color, and from clay loam to fine sandy loam in texture.

The B horizon ranges from 7 to 26 inches in thickness and from clay loam to sandy clay loam in texture. It is mottled in dark grayish brown, dark gray, brown, or dark yellowish brown. This horizon is stratified with fine sandy loam or loamy fine sand in some places.

The Cg horizon is light-gray to grayish-brown sandy clay loam, clay loam, or fine sandy loam that contains dark yellowish-brown, yellowish-red, or strong-brown mottles.

Kosse soils, frequently flooded (Ks).—This soil occupies the flood plain of streams and is subject to overflow. It has a plane slope of less than 1 percent. Soil areas are elongated and are 10 to 200 acres in size.

This mapping unit is 65 percent Kosse clay loam and 15 percent Kosse fine sandy loam. The Kosse clay loam has the profile described as representative for the series. The clay loam is on the broad flat areas next to the hill, and the fine sandy loam occupies the natural levees next to the stream channel.

Included with these soils in mapping are small areas of Tuscumbia clay, Trinity clay, and Bruno loamy fine sand. These included areas comprise about 20 percent of the total acreage.

Most areas of Kosse soils are used for hardwood timber. A few large areas have been cleared for pasture. Common bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. (Capability unit Vw-1; woodland suitability group 9; pastureland and hayland group 5; woodland grazing group 1)

Leefield Series

The Leefield series consists of nearly level, deep, somewhat poorly drained soils that are sandy to a depth of 20 to 40 inches. They have loamy lower layers that contain plinthite in the lower part. These soils developed in loamy deposits.

In a representative profile, the surface layer is gray loamy fine sand about 6 inches thick. The subsurface layer is very pale brown loamy fine sand about 28 inches thick. The next layer is yellowish-brown fine sandy loam, about 6 inches thick, that is mottled with strong brown, grayish brown, and red. Below this is a layer of mottled light-gray, strong-brown, and red sandy clay loam about 15 inches thick.

Leefield soils have moderate available water capacity. They are used for pine timber.

Representative profile of Leefield loamy fine sand in a timbered area 350 feet south of an old tram road from a point 0.4 mile west and 0.5 mile south on a firelane road that is located 1 mile west of a county road that intersects Farm Road 1485 16.1 miles south of Texas Highway 105, at a point 2.8 miles east of its intersection with U.S. Highway 75 at Conroe, Tex.

A1—0 to 6 inches, gray (10YR 5/1) loamy fine sand; structureless; very friable; many tree roots; strongly acid; clear, smooth boundary.

A2—6 to 34 inches, very pale brown (10YR 7/3) loamy fine sand; few, medium, distinct, dark yellowish-brown and strong-brown mottles; structureless; very friable; many tree roots; strongly acid; clear, wavy boundary.

B1t—34 to 40 inches, yellowish-brown (10YR 5/4) fine sandy loam; many, medium, distinct, strong-brown and faint, grayish-brown mottles and few, prominent, red mottles; weak, medium, subangular blocky structure; hard, friable; few patchy clay films, but mainly coating and bridging of sand grains; few fine tree roots; very strongly acid; clear, wavy boundary.

B2t—40 to 65 inches, mottled light-gray (10YR 6/1), strong-brown (7.5YR 5/8), and red (10R 4/6) sandy clay loam; moderate, medium, subangular blocky structure; hard, friable; red material that makes up 20 percent of the mass is brittle; very strongly acid.

The solum is more than 60 inches thick. The A horizon ranges from 20 to 40 inches in thickness and from light gray to pale brown or light yellowish brown in color.

The B1t horizon ranges from 5 to 16 inches in thickness, from yellowish brown to brownish yellow, and from fine sandy loam to loam in texture. This horizon is mottled in shades of gray or brown.

The B2t horizon is mottled in shades of gray, brown, yellow, and red. Plinthite content ranges from 10 to 25 percent.

Leefield loamy fine sand (Le).—This soil has slightly convex slopes of 0.5 percent to 2.0 percent. Soil areas are round and are 25 to 500 acres in size.

Included with this soil in mapping are small areas of Sorter silt loam. These included areas account for less than 5 percent of the total acreage.

Leefield loamy fine sand is used mainly for pine timber. A very small acreage is in crops and pasture. (Capability unit IIw-2; woodland suitability group 3; pastureland and hayland group 3; woodland grazing group 3)

Lucy Series

The Lucy series consists of nearly level to gently sloping, deep, well-drained soils that are sandy to a depth of 21 to 36 inches and have loamy lower layers. These soils developed in loamy deposits on marine or stream terraces.

In a representative profile, the surface layer is grayish-brown loamy fine sand about 7 inches thick. The subsurface layer is brown loamy fine sand about 16 inches thick. The next layer is dark-red sandy clay loam about 34 inches thick. Below this is red sandy clay loam, about 19 inches thick, that is underlain by 10 inches of pink fine sand.

Lucy soils have a moderate available water capacity. They are used for pine timber, and a small acreage is in crops or pasture.

Representative profile of Lucy loamy fine sand in a timbered area 350 feet northeast of a road from a point 5.3 miles south of Farm Road 1314, which is 18.9 miles south of Texas Highway 105 and 1.6 miles east of U.S. Highway 75 at Conroe, Tex.

A1—0 to 7 inches, grayish-brown (10YR 5/2) loamy fine sand; structureless; soft; many tree roots; slightly acid; clear, smooth boundary.

A2—7 to 23 inches, brown (7.5YR 5/4) loamy fine sand; structureless; hard, very friable; many tree roots; few, yellowish-red mottles in the lower part; medium acid; clear, wavy boundary.

B21t—23 to 57 inches, dark-red (2.5YR 3/6) sandy clay loam; moderate, medium, subangular blocky structure; very hard, friable; patchy clay films and sand grains are coated and bridged; few fine tree roots; few, very fine, strongly cemented ferromanganese concretions; many fine pores; strongly acid; gradual, smooth boundary.

B22t—57 to 76 inches, red (2.5YR 5/6) sandy clay loam; few, fine, distinct, reddish-yellow mottles that increase with depth; weak, medium, subangular blocky structure; hard, friable; patchy clay films and sand grains are coated and bridged; very strongly acid; abrupt, smooth boundary.

C—76 to 86 inches, pink (7.5YR 7/4) fine sand; few, fine bands of yellowish-red sandy clay loam; structureless; loose; strongly acid.

The solum is more than 60 inches thick. The A horizon ranges from 21 to 36 inches in thickness and from brown to light brown or very pale brown in hues of 7.5YR and 10YR.

The Bt horizon ranges from 40 to 60 inches or more in thickness and from dark red to red in hues of 10R and 2.5YR.

The C horizon is pink or pale-brown fine sand that contains thin strata of red or yellowish-red sandy loam or sandy clay loam.

Lucy loamy fine sand (Lu).—This nearly level to gently sloping soil has convex slopes that are mainly 0.5 to 3 percent, but some slopes range up to 8 percent on the narrow breaks to the bottom lands. Soil areas are irregular and are 20 to 120 acres in size.

Included with this soil in mapping are small areas of Fuquay loamy fine sand, terrace, and areas that are less than 60 inches thick to the base of the Bt horizon. These included areas make up less than 5 percent of the total acreage.

Most areas of Lucy loamy fine sand were under cultivation at one time, but at present they are used for pine timber. A few small areas are in crops and pasture. Vegetables, small grain, corn, and forage are the main crops. Coastal bermudagrass, common bermudagrass, dallisgrass, and common lespedeza are the principal pasture plants. (Capability unit IIs-2; woodland suitability group 11; pastureland and hayland group 1; woodland grazing group 3)

Oktibbeha Series

The Oktibbeha series consists of gently sloping, deep, moderately well drained, loamy soils that have clayey lower layers. These soils developed in clayey deposits on marine or stream terraces.

In a representative profile, the surface layer is dark-brown clay loam about 4 inches thick. The lower layers, in sequence, are the following: about 5 inches of reddish-brown clay that has yellowish-brown mottles; 11 inches of olive-brown clay that has red and brownish-yellow mottles; 28 inches of gray clay that has olive-yellow and red mottles; and 12 inches of olive-gray clay that has olive-yellow mottles.

Oktibbeha soils have a moderately high available water capacity. These soils are used for pasture. A small acreage is cultivated.

Representative profile of Oktibbeha clay loam in an area of Oktibbeha soils, 2 to 5 percent slopes, eroded, in a pasture 200 feet south of a house that is 0.3 mile south of a county road from a point 2.7 miles north and west of U.S. Highway 75 and 1.8 miles south of the Walker-Montgomery County line.

Ap—0 to 4 inches, dark-brown (10YR 3/3) clay loam; weak to moderate, fine, blocky structure; hard, friable; few, medium, indurated ironstone concretions; slightly acid; abrupt, smooth boundary.

B21t—4 to 9 inches, reddish-brown (5YR 4/4) clay; common, medium, distinct, yellowish-brown (10YR 5/6) mottles; moderate, fine, blocky structure; very hard, very firm, sticky and plastic; continuous clay films or pressure faces on ped surfaces; medium acid; clear, wavy boundary.

B22t—9 to 20 inches, olive-brown (2.5Y 4/4) clay; many, medium, prominent, red (2.5YR 4/8) mottles and distinct, brownish-yellow (10YR 6/6) mottles; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; clay films or pressure faces on peds; common slickensides that do not intersect; few, fine, strongly cemented ferromanganese concretions; strongly acid; clear, wavy boundary.

B23t—20 to 48 inches; gray (5Y 5/1) clay; common, medium, distinct, olive-yellow (2.5Y 6/6) mottles and few, medium, prominent, red (2.5YR 4/8) mottles; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; clay films or pressure faces on ped surfaces; common slickensides that do not intersect; few, fine, strongly cemented ferromanganese concretions; slightly acid; clear, wavy boundary.

C—48 to 60 inches, olive-gray (5Y 5/2) clay; common, medium, faint, olive-yellow (2.5Y 6/6) mottles; massive; very hard, very firm, sticky and plastic; few, very fine, weakly cemented ferromanganese concretions; many, fine to coarse, weakly cemented calcium carbonate concretions; mildly alkaline.

The Ap horizon ranges from 0 to 6 inches in thickness, from brown to dark brown or dark grayish brown in hues of 7.5YR and 10YR, and from slightly acid to strongly acid in reaction. It is clay loam or fine sandy loam in texture.

The Bt horizon ranges from slightly acid to very strongly acid and is mottled in shades of brown, yellow, red, and gray.

The C horizon is neutral to moderately alkaline and is mottled in olive yellow, gray, olive gray, or yellowish brown.

Oktibbeha soils, 2 to 5 percent slopes, eroded (ObC2).—These gently sloping soils are in irregular areas that range from 10 to 50 acres in size.

The texture of the surface layer is variable. It is a mixture of the original loamy surface layer and the underlying clayey layer. In some places it is clay loam, and in other places it is fine sandy loam. There are several shallow gullies per acre that are crossable with farm machinery.

Included with these soils in mapping are small areas of Ferris clay, 1 to 5 percent slopes, eroded. These included areas comprise less than 5 percent of the total acreage.

Most areas of Oktibbeha soils were formerly cultivated, but now they are used for pasture. Common bermudagrass, dallisgrass, and common lespedeza are the principal pasture plants. (Capability unit IVe-2; woodland suitability group 10; pastureland and hayland group 11; woodland grazing group 5).

Osier Series

The Osier series consists of nearly level, deep, poorly to very poorly drained sands. These soils developed in sandy deposits and are saturated with water most of the year.

In a representative profile, the surface layer is grayish-brown sand about 5 inches thick. The next layer is light-gray sand to a depth of more than 63 inches. It has gray mottles in the upper part and gray and yellowish-red mottles in the lower part.

Osier soils have a low available water capacity. They are used for timber.

Representative profile of Osier sand in an area of Osier-Chipley complex, in a timbered area 1,000 feet northwest of campsite on Peach Creek from a point 0.4 mile north of county road and 5.5 miles east of Farm Road 1097, which is 4.6 miles northeast of U.S. Highway 75 at Willis, Tex.

A1—0 to 5 inches, grayish-brown (10YR 5/2) sand; structureless; loose; many tree roots; very strongly acid; clear, smooth boundary.

C1—5 to 46 inches, light-gray (10YR 7/2) sand; common, medium, faint, gray (10YR 6/1) mottles; structureless; loose; many tree roots; very strongly acid; gradual, smooth boundary.

C2—46 to 63 inches, light-gray (10YR 7/2) sand; few, faint, gray and distinct, yellowish-red mottles that in places have a texture of loamy sand; structureless; loose; very strongly acid.

Osier soils are saturated with water during winter and spring. The A1 horizon ranges from 4 to 12 inches in thickness and from grayish brown to light grayish brown to pale brown in color.

The C1 horizon is light gray to grayish brown and has mottles of yellowish red or strong brown.

Osier-Chipley complex (Oc).—The Osier soils are nearly level to slightly concave and have a slope of less than 1 percent. Chipley soils occupy the steeper side slopes in this complex. Soil areas are elongated and are 20 to 500 acres in size.

The Osier soils make up 40 percent of this complex. The Chipley soils make up 30 percent, and other soils make up the rest. The representative profile of Chipley soil is described under the Chipley series. Chipley fine sand is moderately well drained and has rapid internal drainage.

Included with this soil complex in mapping are small areas of Leefield loamy fine sand, Albany fine sand, Conroe loamy fine sand, and Boy fine sand.

The Osier-Chipley complex is used for timber. (Capability unit VIw–3; woodland suitability group 1; pastureland and hayland group 3; woodland grazing group 1)

Robertsdale Series

The Robertsdale series consists of nearly level, deep, somewhat poorly drained, loamy soils that have brittle lower layers. These soils developed in loamy deposits.

In a representative profile, the surface layer is light brownish-gray fine sandy loam about 6 inches thick. The next layer is light brownish-gray fine sandy loam, about 5 inches thick, that contains brownish-yellow mottles. Lower layers, in sequence, are the following: about 16 inches of mottled, light-gray and brownish-yellow fine sandy loam; 9 inches of mottled light-gray, yellowish-red, and yellowish-brown, brittle sandy clay loam; and 24 inches of mottled reddish-yellow, gray, and red, brittle sandy clay loam.

Robertsdale soils have a moderate available water capacity. They are used for pine timber.

Representative profile of Robertsdale fine sandy loam in a timbered area 50 feet south of a firelane road from a point 1.2 miles east of Farm Road 1484 that is 5.7 miles northeast of Texas Highway 105, which is 1.1 miles east of U.S. Highway 75 at Conroe, Tex.

A21—0 to 6 inches, light brownish-gray (10YR 6/2) fine sandy loam; weak granular structure; slightly hard, friable; about 5 percent is very fine to medium, indurated ironstone concretions; slightly acid; clear, smooth boundary.

A22—6 to 11 inches, light brownish-gray (10YR 6/2) fine sandy loam; common, fine, distinct, brownish-yellow mottles; structureless; slightly hard, friable; about 5 percent is fine and medium, indurated ironstone concretions; slightly acid; clear, smooth boundary.

B&A'2—11 to 27 inches, mottled light-gray (10YR 7/2) and brownish-yellow (10YR 6/8) fine sandy loam; weak subangular blocky structure; hard, friable; many fine and medium pores; about 5 percent fine to coarse, indurated ironstone concretions; vertical light-gray areas are clean sand and silt grains; medium acid; clear, wavy boundary.

Bx1—27 to 36 inches, mottled light-gray (10YR 7/2), yellowish-red (5YR 5/8), and yellowish-brown (10YR 5/8) sandy clay loam; weak subangular blocky structure; brittle; very hard, friable; patchy clay films on ped surfaces; about 25 percent is fine to coarse, indurated ironstone concretions; 15 percent plinthite; strongly acid; gradual, smooth boundary.

Bx2—36 to 60 inches, mottled reddish-yellow (7.5YR 6/8), gray (10YR 6/1), and red (2.5YR 5/8) sandy clay loam; weak, subangular blocky structure; brittle; very hard, friable; patchy clay films on ped surfaces; 10 percent, fine to coarse, indurated ironstone concretions; 20 percent plinthite; strongly acid.

The solum is from 60 to more than 100 inches thick. The A horizon ranges from 8 to 19 inches in thickness, from grayish brown to light gray or pale brown in color, and from slightly acid to strongly acid in reaction. The A horizon is mottled in shades of brownish yellow, reddish yellow, or dark brown and contains from 2 to 10 percent very fine to medium, indurated ironstone concretions.

The B&A'2 horizon ranges from 10 to 18 inches in thickness, is mottled light gray, brownish yellow, reddish yellow, yellowish red, yellowish brown, dark brown, or yellow, and is fine sandy loam or loam in texture.

The Bx horizon ranges from medium acid to very strongly acid, is mottled in shades of red, yellow, brown, and gray, and ranges from 10 to 35 percent indurated ironstone concretions. Plinthite content of the Bx horizon ranges from 15 to 25 percent.

Robertsdale fine sandy loam (Ro).—This soil has concave slopes of less than 1 percent and occurs at heads of drainageways. Surface drainage is slow or lacking in some areas, and internal drainage is also slow. Soil areas are elongated and are 20 to 600 acres in size.

Included with this soil in mapping are small areas of Splendora fine sandy loam. These included areas comprise less than 5 percent of the total acreage.

Robertsdale fine sandy loam is used mainly for pine timber. A few small areas have been cleared for pasture. Common bermudagrass, carpetgrass, dallisgrass, and common lespedeza are the principal pasture plants. (Capability unit IIIw–3; woodland suitability group 5; pastureland and hayland group 4; woodland grazing group 4)

Segno Series

The Segno series consists of nearly level to gently sloping, deep, moderately well drained to well drained loamy soils having mottled lower layers that contain plinthite.

In a representative profile, the surface layer is very dark grayish-brown fine sandy loam about 5 inches thick. The subsurface layer is pale-brown fine sandy loam about 9 inches thick. Lower layers, in sequence, are the following: about 20 inches of yellowish-brown sandy clay loam that has strong-brown and reddish-yellow mottles; 10 inches of yellowish-brown sandy clay loam that has gray, red, and yellowish-red mottles; 18 inches of distinctly mottled yellowish-brown, red, and gray sandy clay loam; and 23 inches of distinctly mottled light-gray, red, and strong-brown sandy clay loam.

Segno soils have a moderate available water capacity. They are used for pine timber. A small acreage is in crops and pasture.

Representative profile of Segno fine sandy loam in a timbered area 50 feet south of 3rd compartment road from a point 0.3 mile east of west boundary road of the W. Goodrich Jones State Forest, that is 0.65 mile south of the intersection of the west boundary road and Farm Road 1488, which is 2.5 miles west of Interstate 45 and 5.0 miles south of State Highway 105 at Conroe, Tex.

A1—0 to 5 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; structureless; soft, very friable; many tree roots; slightly acid; clear, smooth boundary.

A2—5 to 14 inches, pale-brown (10YR 6/3) fine sandy loam; structureless; soft, very friable; many tree roots; common fine pores; slightly acid; clear, wavy boundary.

B21t—14 to 34 inches, yellowish-brown (10YR 5/6) sandy clay loam; few, fine, faint, strong-brown and reddish-yellow mottles; weak, medium, subangular blocky structure; hard, friable; thin patchy clay films on ped surfaces; many tree roots; common fine pores; few, fine, strongly cemented ironstone concretions; strongly acid; gradual, wavy boundary.

B22t—34 to 44 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, medium, distinct, gray (10YR 6/1), red (2.5YR 4/8), and yellowish-red (5YR 5/6) mottles; weak, medium, subangular blocky structure; hard, friable; 2 percent plinthite; thin patchy clay films on ped surfaces and in pores; common fine pores; common, fine and medium, strongly cemented ironstone concretions; few weakly cemented ironstone concretions; strongly acid; diffuse, wavy boundary.

B23t—44 to 62 inches, distinctly mottled yellowish-brown (10YR 5/6), red (2.5YR 4/8), and gray (10YR 6/1) sandy clay loam; weak, medium, subangular and angular blocky structure; very hard, friable; brittle red plinthite material comprises 25 percent of the soil mass; few, fine and medium, indurated ironstone concretions; thin patchy clay films; some clay stripping in the vertical gray part; few tree roots in gray part only; strongly acid; diffuse, irregular boundary.

B24t—62 to 85 inches, distinctly and coarsely mottled light-gray (10YR 7/1), red (2.5YR 4/8), and strong-brown (7.5YR 5/6) sandy clay loam; weak, coarse, blocky structure; very hard, friable; contains brittle red plinthite material; few patchy clay films; few pores and fine tree roots in the gray part; gray areas are more clayey; strongly acid.

The solum ranges from 60 to more than 100 inches in thickness. Depth to horizons containing more than 5 percent plinthite ranges from 30 to 45 inches. Base saturation ranges from 35 to 60 percent at a depth of 50 inches below the top of the Bt horizon.

The A horizon ranges from 10 to 20 inches in thickness, from light brownish gray to pale brown or yellowish brown in color, and from very strongly acid to slightly acid in reaction. The upper part of this horizon is darker; it ranges from very dark grayish brown to dark brown.

The B21t and B22t horizons combined range from 12 to 40 inches in thickness and from dark yellowish brown to yellowish brown or brownish yellow in color. They contain few to common mottles in shades of brown, gray, yellow, or red. The B23t and B24t horizons are mottled in shades of yellow, red, gray, or brown and are from 15 to 35 percent plinthite. Reaction of the Bt horizon ranges from very strongly acid to medium acid.

Segno fine sandy loam (Se).—This soil occupies broad, low, convex ridges. Slopes are dominantly 0.5 to 2 percent but range up to 5 percent in a few places. Soil areas are elongated, irregular, or round and 10 to 700 acres in size.

Included with this soil in mapping are small areas of Splendora fine sandy loam, Sorter silt loam, Waller loam, and Fuquay loamy fine sand. These included areas comprise less than 15 percent of the total acreage.

Segno fine sandy loam is used mainly for pine timber. A few cleared areas are in crops and pasture. Corn, vegetables, small grains, and forage are the main crops. Coastal bermudagrass, common bermudagrass, dallisgrass, and common lespedeza are the principal pasture plants. (Capability unit IIe-2; woodland suitability group 4; pastureland and hayland group 9; woodland grazing group 3)

Sorter Series

The Sorter series consists of nearly level, deep, poorly drained, loamy soils that have a high silt content. These soils are saturated with water for long periods each year.

In a representative profile, the surface layer is gray silt loam about 3 inches thick. The subsurface layer is light brownish-gray silt loam about 16 inches thick. The next layer is light brownish-gray silt loam about 49 inches thick. The next layer is light-gray silt loam, about 11 inches thick, that has yellow and brownish-yellow mottles. The underlying material is light-gray fine sandy loam to a depth of more than 110 inches.

Sorter soils have a moderately high available water capacity. They are used for pine and hardwood timber, and a small acreage is in pasture.

Representative profile of Sorter silt loam in a timbered area 50 feet south of Farm Road 2090 from a point 4.0 miles west of U.S. Highway 59 at Splendora, Tex.

A1—0 to 3 inches, gray (10YR 5/1) silt loam; few, faint, yellow mottles; structureless; hard, friable; many fine pores; few worm casts; many tree roots; few, very fine, weakly cemented ferromanganese concretions; medium acid; clear, irregular boundary.

A2g—3 to 19 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, faint, yellow mottles; structureless; hard, very friable; many fine pores; many crayfish krotovinas; few, very fine, weakly cemented ferromanganese concretions; many tree roots; medium acid; gradual, wavy boundary.

B2tg—19 to 68 inches, light brownish-gray (10YR 6/2) silt loam; few, fine, distinct, yellowish-brown mottles in lower part; weak, very coarse, prismatic srtucture; very hard, friable; porous; clay films in pores; few, very fine, weakly cemented ferromanganese concretions; tree roots are mostly along cleavage planes; coating of dark-gray clay in vertical crevices and on krotovina walls; strongly acid; diffuse, wavy boundary.

B3g—68 to 79 inches, light-gray (10YR 7/2) silt loam; common, fine and medium, distinct, yellow (10YR 7/6) and brownish-yellow (10YR 6/6) mottles; structureless; very hard, friable; few fine tree roots; coarse and fine pores; few, very fine, weakly cemented ferromanganese concretions; few lenses of silt loam, and few pockets and lenses of very fine sandy loam; slightly acid; diffuse, wavy boundary.

C1g—79 to 93 inches, light-gray (10YR 7/2) very fine sandy loam; few, coarse, brownish-yellow (10YR 6/6) mottles; weak, coarse, prismatic structure showing very fine sand and silt coatings on outside of prisms; hard, friable; contains irregular lumps of sandy clay loam measuring as much as 2 or 3 inches across the longer axis; few small pockets of very fine sandy loam; slightly acid; diffuse, wavy boundary.

C2g—93 to 110 inches, light-gray (10YR 7/2) fine sandy loam; few, coarse, distinct, brownish-yellow (10YR 6/6) mottles, some of which have reddish-yellow centers; structureless and weak, coarse, prismatic structure; hard, friable; few firm lumps of sandy clay loam measuring as much as 3 inches across the long axis; few fine roots; few pockets of very fine sand up to 1½ inches in diameter; slightly acid.

The solum ranges from 60 to more than 100 inches in thickness. The A horizon ranges from 14 to 36 inches in thickness, from light gray or light brownish gray to white in hues of 10YR to 2.5Y, and from medium to very strongly acid in reaction. In places the A horizon is mottled in shades of yellow, light yellowish brown, strong brown, or yellowish red.

The Btg horizon ranges from 40 to 75 inches in thickness, from light gray to white in hues of 10YR and 2.5Y, and from very strongly acid to slightly acid. This horizon is silt loam or loam in texture and is mottled in shades of yellow, brown, or red.

The Cg horizon ranges from white to light gray in hues of 10YR and 2.5Y, from a very fine sandy loam or silt loam to loam in texture, and from medium acid to neutral in reaction. It is mottled in shades of yellow, brown, or red.

Sorter silt loam (So).—This nearly level to slightly depressional soil has a slope of less than 1 percent. Soil areas are irregular to elongated and from 14 to 1,000 acres in size.

Included with this soil in mapping are small areas of Waller loam. There are also small mounds of either Boy fine sand or Leefield loamy fine sand. These included areas comprise less than 5 percent of the total acreage.

Sorter silt loam is used chiefly for pine and hardwood timber. A few cleared areas are in pasture. Dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. (Capability unit IVw–1; woodland suitability group 2; pastureland and hayland group 2; woodland grazing group 2)

Splendora Series

The Splendora series consists of nearly level, deep, somewhat poorly drained, loamy soils that have brittle lower layers. These soils developed in loamy deposits.

In a representative profile, the surface layer is dark grayish-brown fine sandy loam about 4 inches thick. The subsurface layer is grayish-brown fine sandy loam about 6 inches thick. Lower layers, in sequence, are the following: about 12 inches of mottled yellowish-brown and light brownish-gray loam; 24 inches of highly mottled light brownish-gray, yellowish-brown, and strong-brown sandy clay loam; 23 inches of mottled light brownish-gray, yellowish-brown, and red sandy clay loam; and 26 inches of mottled light-gray, brownish-yellow, and yellowish-red sandy clay loam.

Splendora soils have a moderate available water capacity. They are used mainly for pine timber, and a small acreage is in pasture and crops.

Representative profile of Splendora fine sandy loam in a timbered area 50 feet south of 5th compartment road from a point 1,750 feet east of the west boundary road of the W. Goodrich Jones State Forest, that is 1.15 miles south of Farm Road 1488, which is 2.5 miles west of Interstate 45 and 5.0 miles south of State Highway 105 at Conroe, Tex.

A1—0 to 4 inches, dark grayish-brown (10YR 4/2) fine sandy loam; structureless; hard, very friable; common tree roots; medium acid; clear, irregular boundary.

A2—4 to 10 inches, grayish-brown (10YR 5/2) fine sandy loam; many, fine, faint, light-gray and dark-brown mottles; structureless; hard, very friable; common tree roots; many, fine, vesicular pores; few, fine, strongly cemented, subrounded ironstone concretions; medium acid; clear, wavy boundary.

B—10 to 20 inches, mottled yellowish-brown (10YR 5/6) and light brownish-gray (10YR 6/2) loam; weak, medium, subangular blocky structure; hard, friable; light brownish gray shows clay stripping that has left clean sand and silt grains; common tree roots; common pores; few, fine, strongly cemented ironstone concretions; very strongly acid; gradual, irregular boundary.

B&A'2—20 to 22 inches, light brownish-gray (10YR 6/2) loam; many, medium and coarse, distinct, yellowish-brown (10YR 5/6) mottles; weak subangular blocky structure; hard, friable; light brownish-gray areas are mostly A'2 material essentially stripped of clay and are tongued into horizons above and below; common, fine, strongly cemented ironstone concretions that are subrounded and slightly pitted; common tree roots; very strongly acid; clear, irregular boundary.

Bx1—22 to 46 inches, distinctly mottled light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and strong-brown (7.5YR 5/8) sandy clay loam; contains a few lumps of yellowish-red material having a brittle center; weak subangular blocky structure; hard, brittle; patchy clay films on peds; common, fine and medium, strongly cemented ironstone concretions; very strongly acid; gradual, wavy boundary.

Bx2—46 to 69 inches, prominently mottled light brownish-gray (10YR 6/2), yellowish-brown (10YR 5/6), and red (2.5YR 4/8) sandy clay loam; weak subangular and angular blocky structure; very hard, friable, brittle; patchy clay films on peds; 15 to 25 percent plinthite; few tree roots in the gray soil; strongly acid; diffuse, wavy boundary.

Bx3—69 to 95 inches, prominently and coarsely mottled light-gray (10YR 7/2), brownish-yellow (10YR 6/6), and yellowish-red (5YR 5/6) sandy clay loam; weak blocky structure; extremely hard, friable; macrofabric of weak polygons, about 6 inches in diameter, surrounded by bleached sand and silt; redder areas are brittle; 20 percent plinthite; few clay flows; strongly acid.

The solum ranges from 60 to more than 100 inches in thickness. The depth to horizons containing plinthite ranges from 30 to 50 inches.

The A horizon ranges from 9 to 25 inches in thickness, from grayish brown to pale brown in color, and from slightly acid to strongly acid in reaction.

The B horizon ranges from 8 to 14 inches in thickness and is distinctly mottled in shades of yellow, brown, and gray in hues of 10YR and 2.5YR. The B&A'2 horizon is discontinuous in some places.

The Bx1 horizon ranges from 20 to 30 inches in thickness. The Bx2 horizon ranges from 15 to 25 inches in thickness and is 15 to 35 percent plinthite.

Splendora fine sandy loam (Sp).—This soil has a plane slope of less than 1 percent. Soil areas are irregular and are 10 to 400 acres in size.

Included with this soil in mapping are small areas of Waller loam and Sorter silt loam. There are mounds in places. These included areas comprise less than 10 percent of the total acreage.

Splendora fine sandy loam is used mainly for pine timber. A few small areas have been cleared for crops and pasture. Corn, vegetables, and forage are the main crops. Coastal bermudagrass, common bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. (Capability unit IIw-1; woodland suitability group 4; pastureland and hayland group 4; woodland grazing group 3)

Sunsweet Series

The Sunsweet series consists of gently sloping, deep, well-drained, loamy soils that contain iron concretions and have clayey lower layers.

In a representative profile, the surface layer is yellowish-brown sandy clay loam about 5 inches thick. The next layers, in sequence, are the following: about 7 inches of yellowish-brown sandy clay that contains brittle, red material; 9 inches of mottled red and yellow sandy clay that contains common gray mottles; 21 inches of mottled red and yellow sandy clay that contains light brownish gray and white horizontal streaks and pinkish mottles; 10 inches of mottled brownish-yellow and red sandy clay; and 18 inches of mottled weak-red, red, and pale-brown sandy clay loam.

Sunsweet soils have a moderately high available water capacity. Most areas have been stripped of iron oxide concretions for use on local roads. Most areas of Sunsweet soils are barren, but a few have been planted to pine.

Representative profile of Sunsweet sandy clay loam in an area of Sunsweet soils in a stripped land area 100 feet south of Farm Road 2432 from a point 3.5 miles east of U.S. Highway 75 at Willis, Tex.

A—0 to 5 inches, yellowish-brown (10YR 5/6) sandy clay loam; common, fine and medium, yellow-red (5YR 5/6) mottles; weak blocky structure; hard; inside of some aggregates are dark-red, slightly cemented, incipient iron concretions; few patchy clay films on outside of some peds; 20 percent indurated ironstone concretions; many tree roots; few fine pores; very strongly acid; gradual, smooth boundary.

B21t—5 to 12 inches, yellowish-brown (10YR 5/6) sandy clay; many, coarse, prominent, red (2.5YR 4/8) mottles; moderate, medium, blocky structure; extremely hard; some aggregates are brittle and have slightly cemented iron concretions in their centers; mottles are not cemented and bridged; continuous clay film on ped surfaces; few indurated ironstone concretions; 35 percent plinthite; few tree roots in the yellow matrix; very strongly acid; gradual, smooth boundary.

B22t—12 to 21 inches, prominently and coarsely mottled red (2.5YR 4/8 and 10R 4/8) and yellow (10YR 7/6) sandy clay; common, coarse, distinct, light brownish-gray (10YR 6/2) mottles on the outside of some of the large peds that are 3 to 4 inches in diameter; moderate, coarse, blocky structure breaking to fine and medium blocky structure; extremely hard; many of the coarse aggregates of red material are bridged together; few roots penetrate the thinner red mottles and tend to cluster in the uncemented light brownish-gray and yellow parts; common indurated iron concretions; 35 percent plinthite; very strongly acid; diffuse, smooth boundary.

B23t—21 to 42 inches, prominently and coarsely mottled red (2.5YR 4/8 and 10R 4/8) and yellow (10YR 7/6) sandy clay that has horizontal streaks of light brownish-gray and white, and a few pinkish mottles; moderate, coarse, blocky structure; extremely hard; thick clay films on red and yellow faces, but patchy films on gray faces; very few fine roots penetrate the brittle red material; few indurated ironstone concretions; some gray, more clayey, vertical streaks through the red, coarse, brittle material; 35 percent plinthite; roots are concentrated in the gray soil; very strongly acid; diffuse, smooth boundary.

B24t—42 to 52 inches, prominently and coarsely mottled brownish-yellow (10YR 6/6) and red (10R 4/8) sandy clay; some white streaks; moderate, coarse, blocky structure; extremely hard; outsides of some coarse blocks have glossy continuous clay films; coarse red material is slightly brittle; few, fine and medium, indurated ironstone concretions; some bridging of red material; 35 percent plinthite; few tree roots in white streaks; very strongly acid; gradual, smooth boundary.

B3t—52 to 70 inches, distinctly and coarsely mottled weak-red (10R 5/4), red (2.5YR 4/8 and 10R 4/8), and pale-brown (10YR 7/4) sandy clay loam; moderate, coarse, blocky structure; very hard; 35 percent plinthite; clay plugs in root channels are yellowish brown and at various angles from the horizontal plane; very strongly acid.

The solum is from 60 to more than 80 inches thick. Reaction ranges from strongly acid to very strongly acid.

The A horizon ranges from 3 to 10 inches in thickness, from brown to yellowish brown to yellow in color, and from loamy fine sand to sandy clay loam or clay in texture. In some places the original A horizon was stockpiled and respread, and in other areas part of the B2t horizon, as well as the A horizon, was removed in the stripping operation.

The B21t horizon ranges from 6 to 14 inches in thickness and from yellow to yellowish brown in color. It has yellowish-red and red mottles. Plinthite content of this horizon ranges from 20 to 40 percent.

The B22t, B23t, and B24t horizons combined range from 33 to 56 inches in thickness and have reticular mottles in various shades of red, yellow, and gray. These horizons are 20 to 40 percent plinthite.

The B3t horizon is mottled in shades of red, brown, yellow, and gray and is 20 to 40 percent plinthite.

Sunsweet soils (Ss).—These gently sloping soils are on ridgetops. Slopes are mainly 2 to 5 percent but may range up to 6 percent. The areas are irregular and are 10 to 200 acres in size.

Most areas of this soil are bare of vegetation. These areas have been stripped of the iron oxide concretions for use on local roads. Some areas have been planted to pine (fig. 8), or pine has seeded from adjacent woodland. (Capability unit VIs-1; woodland suitability group 8; pastureland and hayland group 1; woodland grazing group 3)

Susquehanna Series

The Susquehanna series consists of gently sloping to rolling, deep, somewhat poorly drained, loamy soils that have clayey lower layers.

In a representative profile, the surface layer is dark grayish-brown fine sandy loam about 4 inches thick. The subsurface layer is pale-brown fine sandy loam about 5 inches thick. Lower layers, in sequence, are the following: about 8 inches of mottled red, light-gray, and brownish-yellow clay; 9 inches of mottled light-gray, red, and brownish-yellow clay; 12 inches of light-gray clay that has red mottles; 10 inches of light-gray sandy clay that has red mottles; 36 inches of mottled light-gray and red stratified clay loam, sandy clay, and fine sandy loam; and 16 inches of mottled light-gray and red fine sandy loam and loamy fine sand.

The Susquehanna soils have a moderately high available water capacity. These soils are used for pine timber. A small acreage is in pasture or crops.

Representative profile of Susquehanna fine sandy loam, 1 to 5 percent slopes, in a timbered area in the Sam Houston National Forest 50 feet east of Farm Road 149 from a point 6.9 miles north of Texas Highway 105 at Montgomery, Tex.

Figure 8.—**One-year-old plantation of pine on Sunsweet soils.**

A1—0 to 4 inches, dark grayish-brown (10YR 4/2) fine sandy loam; weak granular structure; friable; many tree roots; very strongly acid; clear, smooth boundary.

A2—4 to 9 inches, pale-brown (10YR 6/3) fine sandy loam; structureless; friable, nonsticky; many tree roots; very strongly acid; abrupt, wavy boundary.

B21t—9 to 17 inches, prominently mottled red (2.5YR 4/8), light-gray (2.5Y 7/2), and brownish-yellow (10YR 6/6) clay; moderate, medium, blocky structure; very hard, very firm, very sticky and plastic; continuous clay films on pressure faces; many tree roots; very strongly acid; gradual, wavy boundary.

B22t—17 to 26 inches, prominently and coarsely mottled light-gray (2.5Y 7/2), red (2.5YR 4/8), and brownish-yellow (10YR 6/6) clay; moderate, medium, blocky structure; very hard, very firm, very sticky and plastic; continuous clay films on pressure faces; many tree roots: very strongly acid; gradual, wavy boundary.

B23t—26 to 38 inches, light-gray (10YR 7/1) clay; many, medium, prominent, red (2.5YR 4/8) mottles and few, fine, distinct, brownish-yellow mottles; moderate, medium, blocky structure; very hard, very firm, very sticky and plastic; continuous clay films on pressure faces; very strongly acid; gradual, wavy boundary.

B24t—38 to 48 inches, light-gray (10YR 7/1) sandy clay; moderate, medium and coarse, blocky structure; very hard, very firm, very sticky and plastic; patchy clay films; few tree roots; very strongly acid; gradual, wavy boundary.

B3t—48 to 84 inches, prominently and coarsely mottled, weakly stratified, light-gray (10YR 7/1) clay loam and red (2.5YR 5/8) fine sandy loam having a few yellow mottles; sandy lenses in clay loam part; weak blocky structure; firm, sticky and plastic in gray part and nonplastic in fine sandy loam part; thin bedded; red mottles extend across some of the thin ½- to 2-inch beds; very strongly acid; diffuse, wavy boundary.

C—84 to 100 inches, prominently and very coarsely mottled, light-gray (10YR 7/1) and red (2.5YR 5/8), weakly bedded fine sandy loam and loamy fine sand; structureless; hard, friable; few lenses of sandy clay loam; few tree roots; very strongly acid.

The solum is more than 60 inches thick. Base saturation ranges from 35 to 60 percent at a depth of 50 inches below the top of the Bt horizon.

The A horizon ranges from 4 to 10 inches in thickness and is variable from place to place. Color of the A horizon ranges from dark grayish brown to very pale brown.

The C horizon ranges from sandy clay loam and fine sandy loam to loamy fine sand.

The Susquehanna soils in Montgomery County are outside the defined range for the Susquehanna series. They have a more than 20 percent decrease in clay content within 60 inches of the surface. They are enough like other Susquehanna soils in morphology, composition, and behavior, however, that a new series is not warranted.

Susquehanna fine sandy loam, 1 to 5 percent slopes (SuC).—This soil occupies broad interstream divides. Soil areas are irregular and have slightly convex surfaces. They range from 10 to 260 acres in size.

This soil has the profile described as representative for the series.

Mapped with the soil in the Sam Houston National Forest are small areas, 2 to 5 acres in size, of Garner clay and Burleson clay. In a few places soils are included that have slopes of more than 5 percent. They differ from Susquehanna soils in that the lower layers are slightly redder and less mottled in the upper part. These included areas amount to less than 10 percent of the total acreage.

Susquehanna fine sandy loam, 1 to 5 percent slopes, is used primarily for timber and pasture. Common bermudagrass, Coastal bermudagrass, dallisgrass, and common lespedeza are the principal pasture plants. Some small areas are in crops, mainly corn, cotton, small grains, and forage. (Capability unit IVe–1; woodland suitability group 5; pastureland and hayland group 6; woodland grazing group 4)

Susquehanna fine sandy loam, 5 to 12 percent slopes (SuD).—This soil occupies the breaks to the natural drains and creeks. Surfaces are plane to convex, and slopes are dominantly 5 to 10 percent but range up to 12 percent. Soil areas are irregular to elongated and from 10 to 160 acres in size.

The surface layer is grayish-brown, friable fine sandy loam 7 inches thick. This layer is generally thinnest at higher elevations and thicker on the foot slopes. The mottled clayey lower layers extend to a depth of more than 50 inches. In a few places the upper few inches are free of grayish mottles. The substratum consists of stratified and mottled sandy clay loam, fine sandy loam, or loamy fine sand.

Included with this soil in mapping are small areas of Wicksburg loamy fine sand and Blanton fine sand. These included areas amount to less than 10 percent of the total acreage.

Susquehanna fine sandy loam, 5 to 12 percent slopes, is used mainly for pine timber. Some small areas are in pasture. The principal pasture plants are Coastal bermudagrass, common bermudagrass, and common lespedeza. (Capability unit VIe–1; woodland suitability group 5; pastureland and hayland group 6; woodland grazing group 4)

Trinity Series

The Trinity series consists of nearly level, deep, moderately well drained to somewhat poorly drained, calcareous, clayey soils. These soils occur on flood plains.

In a representative profile, the surface layer is very dark gray clay about 8 inches thick. The next layer is black clay, about 28 inches thick, underlain by about 24 inches of dark-gray clay.

Trinity soils have a moderately high available water capacity. They are used primarily for hardwood timber. Some areas are used for pasture.

Representative profile of Trinity clay, frequently flooded, in a timbered area in Hostetter Creek bottom 0.85 mile west from a point 0.55 mile south and 0.6 mile west of a road "T," which is on a county road 4.0 miles west of U.S. Highway 75 and 3.6 miles south of the Montgomery-Walker County line.

A11—0 to 8 inches, very dark gray (10YR 3/1) clay; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; few, very fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous; abrupt, wavy boundary.

A12—8 to 36 inches, black (10YR 2/1) clay; weak, coarse, blocky structure; very hard, very firm, sticky and plastic; shiny pressure faces on ped surfaces; moderately alkaline; calcareous; gradual, smooth boundary.

C—36 to 60 inches, dark-gray (10YR 4/1) clay; massive; very hard, very firm, sticky and plastic; few, very fine, strongly cemented ferromanganese concretions; few, fine, strongly cemented calcium carbonate concretions; moderately alkaline; calcareous.

Reaction of this soil ranges from mildly to moderately alkaline. The A horizon is very dark gray to black in hues of 10YR and 2.5Y.

The C horizon is gray to dark gray in hue of 10YR. Faint mottles of dark brown or yellowish brown occur in some places.

Trinity clay, frequently flooded (Tc).—This soil occupies the flood plain of streams draining the upland prairie areas of the county. Slopes are less than 1 percent. The surface is smooth to irregular in the old channel areas. Soil areas are irregular and are 20 to 250 acres in size.

This soil has the profile described as representative for the series.

Included with this soil in mapping are small areas of Kaufman clay and Tuscumbia clay. These included areas comprise less than 20 percent of the total acreage.

Most areas of Trinity clay, frequently flooded, are used for hardwood timber. A few areas have been cleared for pasture. Common bermudagrass, dallisgrass, and johnsongrass are the principal pasture plants. Cultivation is not feasible because of frequent overflows. (Capability unit Vw–1; woodland suitability group 9; pastureland and hayland group 5; woodland grazing group 1)

Trinity sandy clay loam, overwash (Th).—This soil occupies the flood plain of streams draining the upland prairie areas of the county. Slopes are less than 1 percent. Soil areas are elongated and from 20 to 100 acres in size. They generally occur along drainageways above some natural or manmade obstruction, for example, a road, turnrow, or fence.

The surface layer is black, firm, alkaline sandy clay loam about 16 inches thick. Subsequent layers are dark gray and very dark gray firm clay that is moderately alkaline and calcareous.

Included in this mapping unit are some areas where the overwash is greater than 24 inches. Also included are small sandy ridges near the mouth of drainageways. These included areas comprise less than 20 percent of the total acreage.

Most areas of Trinity sandy clay loam, overwash, are used for pasture. The principal pasture plants are common bermudagrass, dallisgrass, and common lespedeza. (Capability unit Vw–1; woodland suitability group 9; pastureland and hayland group 5; woodland grazing group 1)

Tuckerman Series

The Tuckerman series consists of level, deep, poorly drained, loamy soils that have mottled clayey lower layers. These soils developed in loamy and clayey deposits on low stream terraces.

In a representative profile, the surface layer is grayish-brown loam about 8 inches thick. The subsurface layer is light brownish-gray loam 7 inches thick. Lower layers, in sequence are the following: about 22 inches of light brownish-gray clay loam that contains yellowish-red mottles; 27 inches of light-gray clay that has yellowish-red mottles; and 14 inches of light-gray clay that contains yellowish-brown mottles.

Tuckerman soils have a moderately high available water capacity. These soils are used for hardwood timber, and a small acreage is in pasture.

Representative profile of Tuckerman loam in a hardwood timber area 100 feet east of Sprawling Oak Drive from a point 0.15 mile north of Needham Road, which is 1.6 miles east of Interstate 45 and 7.7 miles south of Texas Highway 105 at Conroe, Tex.

A1—0 to 8 inches, grayish-brown (10YR 5/2) loam; common, fine, distinct, yellowish-red mottles; weak, fine, subangular blocky structure; hard, friable; many tree roots; many fine pores; strongly acid; clear, smooth boundary.

A2g—8 to 15 inches, light brownish-gray (10YR 6/2) loam; common, medium, prominent, yellowish-red (5YR 4/8) mottles; weak, fine, subangular blocky structure; hard, friable; many tree roots; many fine pores; very strongly acid; gradual, wavy boundary.

B21tg—15 to 37 inches, light brownish-gray (10YR 6/2) clay loam; common, medium, prominent, yellowish-red (5YR 4/8) mottles; weak, coarse, blocky structure; very hard, firm; few tree roots; thin clay films on ped surfaces; strongly acid; clear, wavy boundary.

B22tg—37 to 64 inches, light-gray (10YR 6/1) clay; common, medium, prominent, yellowish-red (5YR 4/8) mottles; weak, medium and coarse, blocky structure; very hard, very firm; few tree roots; clay films on ped surfaces; strongly acid; gradual, wavy boundary.

Cg—64 to 78 inches, light-gray (10YR 6/1) clay; common, medium, distinct, dark yellowish-brown mottles; massive; very hard, very firm; few, very fine, black, weakly cemented concretions; slightly acid.

The solum ranges from 50 to 76 inches in thickness. The A horizon ranges from 4 to 16 inches in thickness and from light grayish brown to grayish brown to light gray or white in color. In places it has mottles of yellowish red, dark yellowish brown, or dark brown.

The Btg horizon ranges from 40 to 60 inches in thickness, from light brownish gray to gray in hues of 10YR to 2.5Y, and from clay loam to clay in texture. There is less than 35 percent clay in the upper 20 inches. This horizon contains common, distinct mottles of yellowish red, strong brown, yellowish brown, or dark yellowish brown.

The Cg horizon is light gray to gray in hues of 10YR and 2.5Y and contains common, distinct mottles of dark yellowish brown, strong brown, or yellowish brown.

Tuckerman loam, heavy substratum (Tk).—This soil occupies slightly depressional areas on low stream terraces and has a slope of less than 0.3 percent. Soil areas are round or elongated and from 10 to 200 acres in size.

Included with this soil in mapping are small sandy mounds of Albany fine sand, Leefield loamy fine sand, and Fuquay loamy fine sand, terrace. The included areas comprise less than 5 percent of the total acreage.

Most areas of Tuckerman loam, heavy substratum, are used for hardwood timber. These areas are characterized by their ashy-gray surface appearance and lack of grasses and woody understory vegetation. (Capability unit IVw-1; woodland suitability group 2; pastureland and hayland group 2; woodland grazing group 2)

Tuscumbia Series

The Tuscumbia series consists of nearly level, deep, poorly drained, clayey soils. These soils developed on the flood plain of streams.

In a representative profile, the surface layer is very dark gray clay about 6 inches thick. Lower layers, in sequence, are the following: about 16 inches of gray clay that contains yellowish-red mottles; 12 inches of dark-gray clay that has yellowish-red mottles; 15 inches of very dark gray clay that has dark-brown mottles; and 14 inches of dark-gray clay that contains dark reddish-brown mottles.

Tuscumbia soils have a moderately high available water capacity. These soils are used for hardwood timber, and a small acreage is in pasture.

Representative profile of Tuscumbia clay, frequently flooded, adjacent to a pipeline that is in a pasture 1,125 feet south of Old Magnolia Road, starting from a point 2.6 miles southwest of Interstate 45 at Conroe, Tex.

A1—0 to 6 inches, very dark gray (10YR 3/1) clay; moderate, coarse, blocky structure; very hard, very firm, very sticky and plastic; many tree roots; slightly acid; clear, smooth boundary.

B21g—6 to 22 inches, gray (10YR 5/1) clay; common, medium, distinct, yellowish-red (5YR 4/6) mottles; moderate, coarse, blocky structure; very hard, very firm, very sticky and plastic; many tree roots; medium acid; gradual, smooth boundary.

B22g—22 to 34 inches, dark-gray (10YR 4/1) clay; few, fine, distinct, yellowish-red mottles; moderate, coarse, blocky structure; very hard, very firm, very sticky and plastic; contains few coarse slickensides that do not intersect; few thin strata of very pale brown coarse sand; medium acid; clear, smooth boundary.

B3g—34 to 49 inches, very dark gray (10YR 3/1) clay; few to common, fine, distinct, dark-brown mottles; moderate, coarse, blocky structure; very hard, very firm, sticky and plastic; few, very fine, weakly cemented ferromanganese concretions; contains few coarse slickensides that do not intersect; medium acid; gradual, smooth boundary.

Cg—49 to 63 inches, dark-gray (10YR 4/1) clay; common, medium, distinct, dark reddish-brown (5YR 3/4) mottles; massive; very hard, very fine, sticky and plastic; bleached sand grains are evident in the broken ends of the soil mass; neutral.

The A horizon ranges from 4 to 12 inches in thickness and from very dark gray to gray in color.

The Bg and Cg horizons are very dark gray to gray or light gray in hues of 10YR, 2.5Y, and 5Y and contain dark reddish-brown, yellowish-red, dark-brown, or dark yellowish-brown mottles.

Tuscumbia clay, frequently flooded (Tu).—This soil occupies the flood plain of streams that drain upland prairies. Slopes are less than 1 percent. Soil areas are elongated and are 10 to 600 acres in size.

Included with this soil in mapping are small areas of Kosse soils, Kaufman clay, and Trinity clay. These included areas comprise less than 10 percent of the total acreage.

Most areas of Tuscumbia clay, frequently flooded, are used for hardwood timber. A few large areas have been cleared for pasture. Common bermudagrass, dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. The frequent flooding of this soil makes cultivation impractical. (Capability unit VIw-2; woodland suitability group 9; pastureland and hayland group 5; woodland grazing group 1)

Waller Series

The Waller series consists of level, deep, poorly drained, loamy soils that have mottled lower layers. These soils developed in loamy deposits.

In a representative profile, the surface layer is grayish-brown loam about 4 inches thick. The subsurface layer is light-gray loam, about 30 inches thick, that has yellowish-brown and strong-brown mottles. The lower layer is gray clay loam about 46 inches thick that contains strong-brown mottles.

Waller soils have a moderately high available water capacity. They are used for timber, and a small acreage is in prairie grasses and sedges.

Representative profile of Waller loam in a timbered area 100 feet north of Farm Road 2090 from a point 8.44 miles west of U.S. Highway 59 at Splendora, Tex.

A1—0 to 4 inches, grayish-brown (10YR 5/2) loam; structureless; massive; very hard, friable; many tree roots; few, fine, soft, black ferromanganese concretions; many crayfish krotovinas that are 1 to 1½ inches in diameter and 6 inches apart; strongly acid; abrupt, smooth boundary.

A2g—4 to 34 inches, light-gray (10YR 7/2) loam; many, fine, distinct, yellowish-brown and strong-brown mottles; structureless; massive; very hard, friable; few fine roots flattened along cracks; crayfish krotovinas have black stains of organic matter along the sides and are filled with very fine sand and silt; very strongly acid; gradual, wavy boundary.

B21tg—34 to 53 inches, gray (10YR 5/1) clay loam; many, medium to coarse, distinct, strong-brown (7.5YR 5/6) mottles; weak prismatic structure breaking to moderate, coarse, blocky structure; very hard, firm; crayfish krotovinas are filled with silt loam, and the walls are coated with clay films; few fine roots that are flattened along ped surfaces; silt films on prism faces, and clay films on the blocky ped faces; few, fine, weakly cemented, black concretions; medium acid; diffuse boundary.

B22tg—53 to 80 inches, gray (10YR 5/1) clay loam; many, medium and coarse, distinct, strong-brown (7.5YR 5/6) mottles; weak blocky structure; very hard, firm; clay films on ped surfaces; few fine gypsum crystals in the lower part; crayfish krotovinas are filled with silt loam and coated with clay films; few, fine, weakly cemented, black concretions; medium acid.

The solum ranges from 60 to more than 100 inches in thickness. The A horizon ranges from 23 to 48 inches in thickness and from light gray to white in color in hues of 10YR and 2.5Y. In many places it is mottled in shades of red, brown, and yellow. Texture of this horizon is loam, silt loam, or fine sandy loam, all within a few feet, and reaction is strongly to very strongly acid.

The Btg horizon is gray to white in hues of 10YR and 2.5Y and is mottled in strong brown, yellowish brown, reddish yellow, or red. This horizon is loam, sandy clay loam, or clay loam; it ranges from medium acid to neutral.

Waller loam (Wa).—This level to slightly depressional soil has a slope of less than 0.3 percent. Water is removed from the surface of this soil very slowly. Soil areas are rounded to elongated and from 10 to 500 acres in size.

This soil has the profile described as representative for the series.

Waller loam is used mainly for hardwood and scattered pine timber. A few small areas have been cleared for pasture. Dallisgrass, carpetgrass, and common lespedeza are the principal pasture plants. (Capability unit IVw-1; woodland suitability group 2; pastureland and hayland group 2; woodland grazing group 2)

Waller soils, ponded (We).—These soils occupy depressional areas from 1 to 4 feet below the surrounding soil areas. Slopes are less than 0.3 percent. Soil areas are rounded and are 10 to 25 acres in size.

The surface layer is light-gray fine sandy loam about 3 inches thick. The subsurface layer is light-gray loam 47 inches thick. It is mottled in shades of brown, yellow, or red in some pedons. The lower part is mottled light-gray clay loam.

Waller soils, ponded, support only water-loving sedges (fig. 9). They have water standing on the surface for long periods. (Capability unit VIIw-1)

Wicksburg Series

The Wicksburg series consists of gently sloping to rolling, deep, well-drained soils that are sandy to a depth of 20 to 37 inches and have clayey lower layers.

In a representative profile, the surface layer is grayish-brown loamy fine sand about 5 inches thick. The subsurface layer is brown loamy fine sand, 8 inches thick, underlain by 16 inches of pale-brown loamy fine sand. Lower layers, in sequence, are the following: about 6 inches of yellowish-brown sandy clay; 15 inches of mottled light-gray, red, and yellowish-brown clay; 22 inches of mottled light-gray, dark-red, and yellowish-brown sandy clay; and 10 inches of mottled dark-red and light-gray sandy clay loam.

Wicksburg soils have a moderately high available water capacity. These soils are used for pine timber. A small acreage is in pasture or crops.

Representative profile of Wicksburg loamy fine sand, 1 to 5 percent slopes, in a timbered area 150 feet west of firelane road from a point 3.0 miles east and south of Forest Road 211, which is 3.25 miles south of the intersection of Farm Roads 1971 and 149 in northwestern Montgomery County.

A1—0 to 5 inches, grayish-brown (10YR 5/2) loamy fine sand; weak, fine, granular structure; soft, very friable; many tree roots; strongly acid; abrupt, wavy boundary.

A21—5 to 13 inches, brown (10YR 5/3) loamy fine sand; structureless; loose; many tree roots; slightly acid; gradual, smooth boundary.

A22—13 to 29 inches, pale-brown (10YR 6/3) loamy fine sand; structureless; loose; many tree roots; slightly acid; abrupt, wavy boundary.

B21t—29 to 35 inches, yellowish-brown (10YR 5/6) sandy clay; moderate, medium, subangular blocky structure; hard, firm; patchy clay films on ped surfaces; few, very fine, strongly cemented ferromanganese concretions; few fine tree roots; very strongly acid; clear, wavy boundary.

B22t—35 to 50 inches, mottled light-gray (10YR 6/1), red (2.5YR 4/8), and yellowish-brown (10YR 5/6) clay; moderate, medium, blocky structure; very hard, firm; clay films on ped surfaces; few fine roots; very strongly acid; gradual, wavy boundary.

B23t—50 to 72 inches, mottled light-gray (10YR 6/1), dark-red (2.5YR 3/6), and yellowish-brown (10YR 5/6) sandy clay; weak to moderate, medium, blocky structure; very hard, very firm; patchy clay films on ped surfaces; very strongly acid; abrupt, smooth boundary.

B3t—72 to 82 inches, mottled dark-red (10R 3/6) and light-gray (2.5Y 7/2) sandy clay loam; weak, blocky structure; very hard, friable; very strongly acid.

The solum is more than 60 inches thick. The A horizon ranges from 20 to 37 inches in thickness, from brown to very pale brown in color, and from slightly acid to strongly acid in reaction.

The B21t horizon ranges from 5 to 9 inches in thickness, from yellowish brown to brownish yellow in color, from medium acid to very strongly acid in reaction, and from sandy clay loam to sandy clay in texture.

The B22t and B23t horizons are sandy clay to clay that is mottled in various shades of gray, red, yellow, and brown. The B3 horizon ranges from sandy clay loam to fine sandy loam. It is mottled in shades of gray, red, yellow, and brown.

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Figure 9.—**Waller soils, ponded, support no timber because water stands on the surface for long periods.**

Wicksburg loamy fine sand, 1 to 5 percent slopes (WkC).—This soil occupies broad interstream divides and has convex slopes. Soil areas are irregular and 16 to 400 acres in size.

This soil has the profile described as representative for the series.

Included with this soil in mapping are small areas of Blanton fine sand, Susquehanna fine sandy loam, Garner clay, and Burleson clay. These included areas comprise less than 5 percent of the total acreage.

Wicksburg loamy fine sand, 1 to 5 percent slopes, is used mainly for pine timber. A few areas have been cleared for crops and pasture. Small grain, corn, vegetables, and forage are the main crops. Coastal bermudagrass, common bermudagrass, and common lespedeza are the principal pasture plants. (Capability unit IIIs-3; woodland suitability group 7; pastureland and hayland group 1; woodland grazing group 3)

Wicksburg loamy fine sand, 5 to 12 percent slopes (WkD).—This soil has strong, convex slopes. Soil areas are elongated and from 15 to 230 acres in size.

The surface layer is brown, very friable loamy fine sand 24 inches thick. This layer is thinnest at the top of the slope and thickest at the foot. Lower layers are yellowish-brown, firm sandy clay mottled with gray and red in the lower part.

Included with this soil in mapping are small areas of Blanton fine sand, which is at the point of the slope, and of Susquehanna fine sandy loam. These included areas comprise less than 10 percent of the total acreage.

Wicksburg loamy fine sand, 5 to 12 percent slopes, is used primarily for pine timber. A few small areas have been cleared for pasture. Coastal bermudagrass, common bermudagrass, and common lespedeza are the principal pasture plants. (Capability unit VIe-2; woodland suitability group 7; pastureland and hayland group 1; woodland grazing group 3)

Use and Management of the Soils

This section describes the major uses, limitations, and management needs of each soil. Capability groupings used by the Soil Conservation Service are explained. Soils of the county are grouped according to their suitability for crops, and predicted yields for major crops are listed. Next the soils are grouped according to their ability to produce pasture and hay. Then use of the soils for woodland, woodland grazing, and wildlife are discussed. Relative suitability of the soils for engineering structures is given; and urban uses of soils, including suitability of various soils for building foundations and recreation facilities, is outlined.

Management of Soils for Crops

This section outlines general soil management practices that increase production or maintain a high level of production of tilled crops on Montgomery County soils. Erosion control, drainage, conservation of soil moisture, and maintenance of fertility are the main objectives of good general soil management practices.

Type and intensity of management needed varies according to the kind of soil and type of farming operation carried out. A primary aid in managing soil is a good cropping system. Such a system maintains or improves the physical condition of the soil; protects the soil during critical periods such as heavy rains or flooding, drought, and strong winds; aids in the control of weeds, insects, and plant diseases; and provides an adequate economic return. In a system of this kind crops are grown in a sequence or rotation in which soil improving crops balance soil depleting crops. Soil improving crops are those that leave large amounts of residue, such as grasses and legumes. Row crops, in general, are soil depleting.

Most soils in Montgomery County respond to some type of fertilization. The use of commercial fertilizers and lime should be based on crop needs determined by soil tests. The amount and type of fertilizer needed will vary according to the nature of the soil, crop to be grown, production desired, previous land use or cropping history, season, and amount of available moisture.

Capability Groups of Soils

Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, horticultural crops, or other crops requiring special management.

Those familiar with the capability classification can infer from it much about the behavior of soils when used for other purposes, but this classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for range, forest trees, or engineering.

In the capability system, all kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

CAPABILITY CLASSES, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use. (No class I soils in this county.)
Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.
Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.
Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.
Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife.
Class VII soils have very severe limitations that make them unsuited to cultivation and that restrict their use largely to pasture or range, woodland, or wildlife.
Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. (No class VIII soils in this county.)

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by *w*, *s*, and *c*, because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-2 or IIIs-2. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraph; and the Arabic numeral specifically identifies the capability unit within each subclass.

In the following pages the capability units in Montgomery County are described and suggestions for the use and management of the soils are given.

CAPABILITY UNIT IIe-1

Houston Black clay is the only soil in this unit. It is a deep, nearly level to gently sloping, clayey soil of the uplands. It is calcareous, is very slowly permeable, has moderately high available water capacity, and is difficult to work.

This soil is used for crops and pasture. Cotton, corn, small grains, grain sorghum, and forage are the chief crops.

Good management of this soil requires practices that control erosion and maintain fertility and tilth. On cropland, terraces and contour cultivation help to control erosion. The cropping system should include crops that produce a large amount of residue, and the residue should be kept on or near the surface of the soil.

CAPABILITY UNIT IIe-2

This unit consists of deep, nearly level to gently sloping soils that have a fine sandy loam surface layer and sandy clay loam lower layers. Permeability is moderately slow, and the available water capacity is moderate. Because of their slope, these soils are slightly to moderately susceptible to erosion.

Most areas of these soils are used for timber. Small areas are used for corn, small grain, forage crops, and vegetables.

Good management of these soils requires practices that control erosion and maintain fertility and tilth. Contour tillage or terracing may be beneficial. Cropping systems that include deep-rooted plants and crops that produce a large amount of residue help to reduce erosion and excessive compaction and to maintain organic matter in the soil.

CAPABILITY UNIT IIs-1

Angie fine sandy loam is the only soil in this unit. It is a deep, nearly level soil that has a fine sandy loam surface layer and slowly permeable sandy clay loam and sandy clay lower layers. It has moderate available water capacity.

Most areas of this soil are used for pasture. A few small areas are used for corn, small grain, forage crops, and vegetables.

Soil management practices that maintain fertility and tilth are needed. The cropping system should include broadcast and row crops that produce a large amount of residue. Crop residue should be kept on or near the surface of the soil to prevent crusting, to maintain a high level of organic matter in the soil, and to reduce erosion.

CAPABILITY UNIT IIs-2

These soils are deep and have a loamy fine sand surface layer over sandy clay loam lower layers. They are moderately permeable and have a moderate available water capacity.

These soils are used mainly for timber. Some areas are used for pasture and crops. Corn, small grain, forage, and vegetables are the major crops grown.

Good soil management practices are those that prevent leaching and maintain fertility and tilth. The cropping system should include either broadcast or row crops that produce a large amount of residue. Crop residue should be kept on or near the surface of the soils.

CAPABILITY UNIT IIw-1

Splendora fine sandy loam is the only soil in this unit. It is a deep, level soil that has a fine sandy loam surface layer over moderately slowly permeable lower layers. This soil is somewhat poorly drained and has a moderate available water capacity.

Timber is grown on most areas of this soil, but some areas are in pasture and crops. Corn, forage, and vegetables are the major crops.

Good management practices include water removal, maintenance of a high level of organic matter in the soil, and improvement of tilth. Row direction and shallow drains may be necessary for drainage. The cropping system should include deep-rooted plants and crops that produce a large amount of residue. Crop residue should be kept on or near the surface of the soil.

CAPABILITY UNIT IIw-2

Leefield loamy fine sand is the only soil in this unit. It is a deep soil that has a loamy fine sand surface layer over somewhat poorly drained sandy clay loam lower layers. This soil has moderately slow permeability and a moderate available water capacity.

This soil is used mainly for pine timber, but a very small acreage is in pasture and crops. The major crops grown are corn and forage. Management needs of these soils are practices that assist in water removal, prevention of leaching, and maintenance of fertility and tilth. Row direction and shallow drains are necessary for drainage in places. Cropping systems should include either broadcast or row crops that produce a large amount of residue. Residue should be kept on or near the surface.

CAPABILITY UNIT IIw-3

Katy fine sandy loam is the only soil in this unit. It is a deep, nearly level to gently sloping soil that has a fine sandy loam surface layer and mottled clayey lower layers. It is somewhat poorly drained, is very slowly permeable, and has a moderate available water capacity.

This soil is used chiefly for crops, though some areas are in pasture. Corn, small grains, vegetables, and forage are the major crops.

Good soil management includes practices that assist in water removal, prevent leaching, and maintain or improve fertility and tilth. The cropping system should include crops, either broadcast or row crops, that produce a large amount of residue, and the residue should be kept on or near the surface of the soil. Row direction to facilitate drainage may be needed in places.

CAPABILITY UNIT IIw-4

Kipling soils, 0 to 1 percent slopes, are the only soils in this unit. These are deep, nearly level soils that have a fine sandy loam to clay loam surface layer over mottled clay lower layers. They are very slowly permeable and have a moderately high available water capacity.

These soils are used for crops and pasture. Major crops are cotton, corn, grain sorghum, small grains, and forage.

Management needs of these soils are control of surface water and maintenance of fertility and tilth. On cropland, row direction for the removal of excess surface water may be needed. The cropping system should include frequent plantings of crops that produce a large amount of residue. Residue should be kept on or near the surface of the soils.

CAPABILITY UNIT IIIe-1

These are deep, nearly level to gently sloping soils that have fine sandy loam, clay loam, or clay surface layer and mottled clay lower layers. They are very slowly permeable, have a moderately high available water capacity, and are difficult to work.

These soils are used for pasture, crops, and timber. Principal crops grown are cotton, corn, small grain, grain sorghum, and forage.

Management needs of these soils are erosion control in gently sloping areas, and maintenance of fertility and tilth. In the nearly level areas, row direction can be used to remove excess surface water. Terraces and contour cultivation are needed on the gentle slopes. The cropping system should include frequent plantings of crops that produce a large amount of residue. Crop residue should be kept on or near the soil surface.

CAPABILITY UNIT IIIs-1

These soils are deep, nearly level to gently sloping loamy fine sands and gravelly loamy fine sands that have reticulately mottled clay lower layers. They are slowly permeable and have a moderate available water capacity.

These soils are used mainly for pine timber. A very limited acreage is in crops and pasture. Principal crops are corn, small grain, and forage.

Soil management that prevents leaching and maintains fertility and tilth is needed. The cropping system should include crops that produce a large amount of residue. This residue from either broadcast or row crops should be kept on or near the surface. Fertilizer should be applied in small amounts, at intervals, during the growing season.

CAPABILITY UNIT IIIs-2

These soils are deep, loamy fine sands or fine sands. They are somewhat poorly drained to somewhat excessively drained and have a low available water capacity.

These soils are used mainly for pine timber, but some areas are in pasture and crops. Corn, small grain, vegetables and forage are the major crops. Soil management that prevents leaching, maintains organic matter content, and improves tilth is needed. Cropping systems should include frequent plantings of crops that produce a large amount of residue. This residue helps maintain a high level of organic matter and improves the fertility and water-holding capacity of the soils.

CAPABILITY UNIT IIIs-3

Wicksburg loamy fine sand, 1 to 5 percent slopes, is the only soil in this unit. It is a deep, loamy fine sand that has sandy clay and clay lower layers. It is rapidly permeable in the surface layer, is slowly permeable in the lower layers, and has a moderately high available water capacity.

This soil is used primarily for pine timber, but some areas are in pasture and crops. Major crops are corn, small grains, forage, and vegetables.

Useful management practices are those that control erosion, prevent leaching, and maintain fertility and tilth. The cropping system should include close-spaced crops that produce a large amount of residue. Crop residue should be kept on or near the soil surface. Fertilizer should be applied in small, frequent applications during the growing season.

CAPABILITY UNIT IIIw-1

These are deep, nearly level soils that have a fine sandy loam surface layer over clay lower layers. They are very slowly permeable, are somewhat poorly to poorly drained, and have a moderately high available water capacity.

These soils are used mainly for timber, but there is a small acreage in pasture and crops. The chief crops are corn and forage.

Management is needed that assists in water removal and maintains soil productivity and tilth. The cropping system should include deep-rooted plants and row or broadcast crops that produce a large amount of residue. Crop residue should be kept on or near the soil surface. Row direction and shallow drains may be necessary for drainage in some areas.

CAPABILITY UNIT IIIw-2

Garner clay is the only soil in this unit. It is a deep, nearly level to gently sloping soil that has a clay surface layer and mottled clay lower layers. It is very slowly permeable, has a moderately high available water capacity, and is difficult to work. It is acid to alkaline.

This soil is used for pasture, crops, and timber. Corn, small grain, grain sorghum, and forage are the major crops.

Good management of this soil includes practices that maintain fertility and tilth and control excess surface water in level areas. Row direction may be desirable to remove excess surface water in the level areas. The cropping system should include frequent plantings of crops that produce a large amount of residue. This residue should be kept on or near the soil surface.

CAPABILITY UNIT IIIw-3

Robertsdale fine sandy loam is the only soil in this unit. It is a deep fine sandy loam over mottled lower layers that include a fragipan. This soil is level, is somewhat poorly drained, has moderately slow permeability, and has moderate available water capacity.

Timber is grown on most areas of this soil. A few areas are in pasture.

Management is needed that assists in water removal and maintains organic matter and tilth. If crops are grown on this soil, the cropping system should include deep-rooted plants and either row or broadcast crops that produce a large amount of residue. Crop residue should be kept on or near the surface of the soil. Under cultivation, row direction and shallow drains may be necessary for drainage.

CAPABILITY UNIT IVe-1

Susquehanna fine sandy loam, 1 to 5 percent slopes, is the only soil in this unit. It is a deep, gently sloping soil having a fine sandy loam surface layer and clay lower layers. It is very slowly permeable and has a moderately high available water capacity.

This soil is used for timber, pasture, and crops. Major crops are cotton, corn, small grain, and forage.

Management practices should help control erosion and improve productivity and tilth. A combination of terracing and cultivation on the contour helps to control erosion and conserve moisture. The cropping system should include frequent plantings of crops that produce a large amount of residue, and this residue should be kept on or near the soil surface.

CAPABILITY UNIT IVe-2

These are deep, undulating soils that have an eroded clay or clay loam surface layer that overlies lower layers of mottled clay. These soils are very slowly permeable and have a moderately high available water capacity.

The soils in this unit are used for pasture. Good management includes practices that increase fertility and maintain a grass cover to control erosion.

CAPABILITY UNIT IVs-1

Gunter fine sand is the only soil in this unit. It is a deep sand over reticulately mottled sandy clay loam or sandy loam lower layers. The surface layer is rapidly permeable, and lower layers are moderately permeable. The available water capacity is low.

This soil is used for pine timber. Some areas are being developed for housing.

CAPABILITY UNIT IVs-2

Blanton fine sand, 5 to 12 percent slopes, is the only soil in this unit. It is a strongly rolling, deep sandy soil that is somewhat excessively drained and has a low available water capacity.

This soil is used for pine timber. Small areas are in pasture. Management includes practices that control erosion, prevent leaching, maintain organic matter, and improve tilth. Cropping systems should be largely confined to close-spaced crops, such as grasses and legumes, that produce a large amount of residue. Fertilizer should be applied frequently in small amounts.

CAPABILITY UNIT IVw-1

These are deep soils that have a silt loam or loam surface layer and silt loam to clay loam lower layers. They are slowly to very slowly permeable and have a moderately high available water capacity.

These soils are used mainly for timber. Only small acreages are in pasture. Good soil management includes drainage for removal of excess water and improvement of fertility.

CAPABILITY UNIT Vw-1

These are deep clays, sandy clay loams, or clay loams that are located on the flood plain of streams. They are moderately well drained to somewhat poorly drained and have a moderate to moderately high available water capacity. They are subject to frequent overflows.

These soils are used for timber and pasture. Fertility improvement and maintenance of soil cover are primary concerns of management. Small applications of fertilizer should be made frequently during the growing season.

CAPABILITY UNIT Vw-2

These soils are deep loamy fine sands or sands. They are somewhat excessively drained to excessively drained, have a low available water capacity, and are subject to frequent overflows.

These soils are used for timber and pasture. Some areas are sandbars, barren of vegetation.

Management needs include fertility improvement and maintenance of soil cover. Small applications of fertilizer should be made frequently during the growing season.

CAPABILITY UNIT VIe-1

Susquehanna fine sandy loam, 5 to 12 percent slopes, is the only soil in this unit. It is a deep, rolling soil that has a fine sandy loam surface layer over mottled clay lower layers. It is very slowly permeable and has a moderately high available water capacity.

This soil is used mainly for timber. Some minor areas are in pasture.

Fertility improvement and maintenance of continuous soil cover to control erosion are the primary concerns of management.

CAPABILITY UNIT VIe-2

These rolling soils have a thick loamy fine sand surface layer over mottled sandy clay loam to sandy clay lower layers. They have a rapidly permeable surface layer, slowly permeable lower layers, and a moderate to moderately high available water capacity.

These soils are used primarily for pine timber. Minor areas are in pasture.

Fertility improvement and maintenance of continuous cover to control erosion are the primary management needs.

CAPABILITY UNIT VIe-3

These are deep, rolling, eroded clay soils. They are very slowly permeable and have a moderately high available water capacity.

These soils are used for pasture. Good management practices include fertility improvement and maintenance of continuous soil cover to control erosion.

CAPABILITY UNIT VIs-1

Sunsweet soils are the only soils in this unit. These soils have been surface mined for their ironstone gravel. They have a thin loamy surface layer of fine sand, sandy clay loam, or clay. Lower layers are reticulately mottled clay. These soils are moderately slowly permeable and have a moderately high available water capacity.

Most areas of these soils are barren. After mining, barren areas can be revegetated by seeding to forests or grasses and fertilizing. Such revegetation helps control erosion.

CAPABILITY UNIT VIw-1

Bibb soils, frequently flooded, are the only soils in this unit. These soils have a seasonally high water table and are subject to frequent overflows. They have a moderate available water capacity.

These soils are used primarily for timber; a limited acreage is in pasture.

Fertility improvement and maintenance of plant cover to control erosion during flooding are the main management needs.

CAPABILITY UNIT VIw-2

Tuscumbia clay, frequently flooded, is the only soil in this unit. This is a deep, poorly drained, clayey soil of the bottom lands that is subject to frequent overflows. It has a moderately high available water capacity.

This soil is used for timber and pasture. Management needs include drainage, fertility improvement, and maintenance of soil cover to control erosion during flooding.

CAPABILITY UNIT VIw-3

Osier-Chipley complex is in this unit. The soils in this complex are deep and sandy. They have a permanent high water table and a low available water capacity. They are used for pine and hardwood timber.

CAPABILITY UNIT VIIw-1

Waller soils, ponded, are the only soils in this unit. These soils have a loam, silt loam, or fine sandy loam surface layer and sandy clay loam or clay loam lower layers. They pond water on the surface for long periods during the wet season.

These soils are in water-loving sedges.

Estimated Crop Yields

Crop yields in Montgomery County reflect the management the soils have received. Consistent high yields indicate a soil has been well managed. Soils that are used within their capabilities and managed according to their needs will produce the best average yields. Such management includes the use of terraces and contour farming where needed, residue management, proper pasture use, and a conservation cropping system. When these conservation practices are not used, crop yields are low.

The yields in table 2 are predictions for average acre yields on cropland for the principal crops grown in the county. These are estimated yields over a 15 to 20 year period and cannot be expected every year. In some years they will be higher, and in others they will be lower. These yields are based on records of experiment stations and on information from farmers and others familiar with the soils and farming of the county.

Several levels of management are used by different farmers in the county. However, predictions were made for only one level of management, a high level. This level

TABLE 2.—*Estimated average acre yields of principal crops*

[Absence of an entry in a column indicates crop is not suited to the soil or is not commonly grown on it]

Soil	Cotton	Corn	Grain sorghum	Oats	Common bermudagrass	Coastal bermudagrass	
	Lbs. of lint	*Bu.*	*Bu.*	*Bu.*	*A.U.M.*[1]	*Tons*	*A.U.M.*[1]
Albany fine sand	325	55	----	55	4.5	4.8	8.0
Angie fine sandy loam	500	60	50	45	7.0	5.4	9.0
Bibb soils, frequently flooded	----	----	----	----	5.0	3.6	6.0
Blanton fine sand, 0 to 5 percent slopes	325	60	----	45	4.5	5.0	8.3
Blanton fine sand, 5 to 12 percent slopes	----	----	----	----	3.0	3.0	5.0
Boy fine sand	350	60	----	45	5.5	4.6	7.5
Bruno loamy fine sand	----	----	----	----	7.0	6.0	10.0
Burleson clay	420	45	58	50	----	4.8	8.0
Chipley fine sand	----	----	----	----	4.0	5.0	8.5
Conroe gravelly loamy fine sand, 0 to 5 percent slopes	----	----	----	----	----	----	----
Conroe loamy fine sand, 0 to 5 percent slopes	----	----	----	----	----	4.8	8.0
Conroe loamy fine sand, 5 to 12 percent slopes	----	----	----	----	----	----	----
Crevasse sand	----	----	----	----	----	----	----
Crowley fine sandy loam	----	----	----	----	4.5	5.4	9.0
Edna-Katy complex: Edna	375	30	48	----	4.0	5.4	9.0
For yields on Katy part of Edna-Katy complex, see Katy fine sandy loam.							
Eustis loamy fine sand	325	50	34	45	5.0	4.8	8.0
Ferris clay, 1 to 5 percent slopes, eroded	350	45	41	60	----	4.2	7.5
Ferris clay, 5 to 8 percent slopes, eroded	----	----	----	----	----	----	----
Ferris-Gullied land complex, 3 to 8 percent slopes	----	----	----	----	----	----	----
Fuquay loamy fine sand	480	55	50	40	7.0	6.6	11.0
Fuquay loamy fine sand, terrace	500	60	60	45	8.0	6.6	11.0
Garner clay	500	50	58	45	2.5	4.2	7.0
Gunter fine sand	----	----	----	----	----	----	----
Hockley fine sandy loam	500	80	60	70	7.0	7.2	12.0
Houston Black clay	450	57	64	70	5.0	4.8	8.0
Katy fine sandy loam	450	50	50	35	4.5	6.0	10.0
Kaufman clay, frequently flooded	----	----	----	----	4.0	5.4	9.0
Kipling fine sandy loam, 1 to 3 percent slopes	350	45	48	45	5.0	4.8	8.0
Kipling soils, 0 to 1 percent slopes	450	45	50	40	5.0	4.2	7.0
Kipling clay loam, 1 to 3 percent slopes	425	44	50	40	4.8	4.0	6.5
Kosse soils, frequently flooded	----	----	----	----	5.0	5.4	9.0
Leefield loamy fine sand	----	----	----	----	4.5	5.0	8.5
Lucy loamy fine sand	500	65	54	60	6.0	5.4	9.0
Oktibbeha soils, 2 to 5 percent slopes, eroded	200	30	44	40	4.0	3.0	4.5
Osier-Chipley complex: Osier	----	----	----	----	----	----	----
For yields on Chipley part of Osier-Chipley complex, see Chipley fine sand.							
Robertsdale fine sandy loam	----	----	----	----	4.0	4.2	7.0
Segno fine sandy loam	500	70	54	60	7.2	6.6	11.0
Sorter silt loam	----	----	----	----	2.5	3.0	5.0
Splendora fine sandy loam	250	35	35	40	4.8	4.8	8.0
Sunsweet soils	----	----	----	----	----	----	----
Susquehanna fine sandy loam, 1 to 5 percent slopes	300	40	40	35	2.5	3.6	6.0
Susquehanna fine sandy loam, 5 to 12 percent slopes	----	----	----	----	2.0	3.0	5.0
Trinity clay, frequently flooded	----	----	----	----	3.0	5.4	9.0
Trinity sandy clay loam, overwash	----	----	----	----	3.5	5.4	9.0
Tuckerman loam, heavy substratum	----	----	----	----	2.5	3.0	5.0
Tuscumbia clay, frequently flooded	----	----	----	----	----	----	
Waller loam	----	----	----	----	----	----	
Waller soils, ponded	----	----	----	----	----	----	
Wicksburg loamy fine sand, 1 to 5 percent slopes	350	45	40	30	3.0	4.2	7.0
Wicksburg loamy fine sand, 5 to 12 percent slopes	----	----	----	----	2.5	3.0	5.5

[1] A.U.M. stands for animal-unit-month, a term used to express the carrying capacity of pasture. It is the number of animal units carried per acre, multiplied by the number of months the pasture is grazed during a single grazing season without injury to the sod. An acre of pasture that provides 2 months of grazing for 2 cows has a carrying capacity of 4 animal-unit-months.

of management is one in which all the better soil, plant, and water management methods are used. A high level of management for soils in this county includes:

1. Consistent use of soil-improving crops, cover crops, and high-residue crops in rotations.
2. Proper management of crop residues.
3. Conservation of moisture by such practices as terracing and contour farming.
4. Soil fertility is maintained by timely applications of fertilizer in amounts determined by soil and crop needs.
5. Insects, disease, and weeds are effectively controlled.
6. Tillage is minimum but timely.
7. Improved crop varieties and strains are used.
8. Mechanical measures are effectively maintained.
9. Proper use and management of grasses including rotational grazing.
10. Drainage is applied as needed.

Use of Soils for Pastureland and Hayland

Present pastures in Montgomery County are largely made up of warm-season grasses and cool-season legumes. Some acreage is used also for cool-season perennial grasses. The most commonly used legumes are vetch, white clover, crimson clover, and burclover. These are overseeded on established stands of bermudagrass and dallisgrass.

The major management practices needed on pastureland are fertilization, weed control, and controlled grazing. Fertilizers should be applied according to plant needs, the level of production desired, and the results of soil tests. Weeds can be controlled by such mechanical means as mowing or shredding, or the use of weed-control herbicides. Weed control on a well-managed pasture is less of a problem than it is on an overused, poorly managed pasture.

Temporary pasture is often used to supplement permanent pasture or for production of hay. Sudangrass, johnsongrass, and the sorghum-sudan grasses make good supplemental summer pasture. Small grains provide good supplemental winter forage.

In Montgomery County hay is made largely from native bluestem, introduced bluestem, bermudagrass, or dallisgrass. Yields range from ½ ton to 6 tons or more per acre depending on the soil type, the grass used, amount of fertilizer applied, and other management.

Management considerations for hay are generally the same as those for good pasture. Hay should be cut at a height that has been proven best for the grass used. Cutting too close to the ground, or cutting too often, damages hayland in the same way that overgrazing damages pasture.

Pastureland and hayland groups

The soils in Montgomery County have been placed in pastureland and hayland groups according to their suitability for the production of forage. The soils in each group are enough alike to be suited to the same grasses, have similar limitations and hazards, require similar management, and have similar productivity and other responses to management. The pastureland and hayland groups in Montgomery County are identified by numerals, for example, 1, 2, or 3. An adequate supply of water for livestock is needed for all pastures.

Management of the soils by pastureland and hayland groups

In this subsection, the twelve pastureland and hayland groups that occur in Montgomery County are described, and good management practices are discussed.

PASTURELAND AND HAYLAND GROUP 1

This group consists of deep, acid, nearly level to rolling soils of the uplands. These soils have a sandy surface layer 20 to 40 inches thick over loamy and clayey lower layers or have a sandy clay loam surface layer over clayey lower layers. Soils of this group are moderately to slowly permeable and are well drained to moderately well drained. Available water capacity is moderate to moderately high.

Soils of this group are used mostly for pasture, but some of the less sloping areas are used for hay. Coastal bermudagrass and common bermudagrass are the main grasses.

Good management of pasture requires proper stocking rates, rotational grazing, application of fertilizer and lime, and weed control. A point of good management for hayland is cutting forage at a height that will not damage the root system and cutting at the proper growth stage for maximum palatability and nutritional value.

PASTURELAND AND HAYLAND GROUP 2

This group consists of deep, nearly level to slightly depressed, somewhat poorly drained to poorly drained soils. These soils have a fine sandy loam, loam, or silt loam surface layer over silt loam, clay loam, or clay lower layers. They are slowly to very slowly permeable, and water ponds on the surface during the rainy season. Available water capacity is moderately high.

Soils of this group are used mostly for pasture, but some areas are used for hay. Common bermudagrass and Coastal bermudagrass are the main grasses.

Good pasture management includes simple drainage to remove ponded water. Proper stocking rates, rotational grazing, fertilization and lime, and weed control are also needed. For hayland, fertilization is required, and cutting the forage at the height and growth stage suitable for the grass used.

PASTURELAND AND HAYLAND GROUP 3

This group consists of deep, acid, nearly level to gently sloping, sandy soils. These soils have a sandy surface layer 20 to 60 or more inches thick over loamy or sandy lower layers. They are rapidly permeable in the sandy layers, are rapidly to moderately slowly permeable in the lower layers, have little or no surface runoff, and have a low available water capacity.

Soils of this group are used for pasture and hay. Coastal bermudagrass and common bermudagrass are the principal grasses.

Well-managed pastures require proper stocking rates, rotational grazing, fertilizer and lime, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 4

This group consists of deep, acid, nearly level to slightly concave soils in drainheads. These soils have a fine sandy loam surface layer and mottled sandy clay loam lower layers. They are somewhat poorly drained and have a moderate available water capacity. Some areas contain ironstone concretions.

Soils of this group are used for pasture and hay. Common bermudagrass, Coastal bermudagrass, and dallisgrass are the principal grasses.

Good pasture management includes use of proper stocking rates, fertilizer and lime, rotational grazing, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 5

This group consists of deep, noncalcareous to calcareous, alluvial soils along stream bottoms. These loamy and clayey soils are moderately to very slowly permeable, are subject to frequent overflows, and have a moderate to moderately high available water capacity.

Soils of this group are used mainly for pasture, but some areas are used for hay. Common bermudagrass and dallisgrass are the principal grasses.

Good management of pasture requires proper stocking rates, rotational grazing, fertilization, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 6

This group consists of deep soils that have a fine sandy loam surface layer over mottled clayey lower layers. These soils occupy gently sloping to sloping ridgetops and rolling side slopes along drainageways. Soils in this group have an abrupt textural change between the surface layer and lower layers. They are very slowly permeable and have a moderately high available water capacity.

Soils of this group are used for both pasture and hay. Common bermudagrass and Coastal bermudagrass are the principal grasses.

Good pasture management includes proper stocking rates, fertilizer and lime, rotational grazing, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 7

This group consists of deep, acid, nearly level to undulating, sandy soils on convex ridgetops and rolling side slopes. These soils have a sandy surface layer over sandy to sandy clay loam lower layers. They are rapidly to moderately slowly permeable and have a low available water capacity.

Soils of this group are used for both pasture and hay. Coastal bermudagrass and common bermudagrass are the main grasses.

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Good pasture management includes use of proper stocking rates, fertilizer and lime, rotational grazing, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 8

This group consists of deep, nearly level to gently rolling, clayey soils of the uplands. These soils are calcareous and noncalcareous clay throughout. Some of the soils are eroded and contain many gullies and rills.

Soils of this group are used for pasture and hay. Common bermudagrass, Coastal bermudagrass, dallisgrass, and johnsongrass are the main grasses.

Good pasture management includes proper stocking rates, rotational grazing, fertilization, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 9

This group consists of deep, acid, nearly level to gently sloping, fine sandy loam soils. These soils have a fine sandy loam surface layer and sandy clay loam, sandy clay, or clay lower layers. They are moderately slowly to very slowly permeable.

Soils of this group are used for both pasture and hay. Common bermudagrass and Coastal bermudagrass are the principal grasses.

Good pasture management requires proper stocking rates, fertilizer and lime, rotational grazing, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 10

Bibb soils, frequently flooded, are the only soils in this unit. These are deep alluvial soils that occur in stream bottoms. These soils are loamy, are moderately permeable, and have very slow surface runoff and a moderate available water capacity. They are subject to overflow and are saturated with water during the cool, moist season.

Bibb soils are used for pasture and hay. Common bermudagrass and dallisgrass are the principal grasses.

Well-managed pastures require proper stocking rates, fertilization according to soil tests, rotational grazing, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 11

This group consists of deep, noncalcareous, nearly level to gently sloping, loamy soils. On the gentle slopes there are broad, shallow gullies and many rills. Available water capacity is moderately high.

Soils of this group are used mainly for pasture. Common bermudagrass and dallisgrass are the principal grasses.

Good pasture management requires proper stocking rates, rotational grazing, fertilization, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

PASTURELAND AND HAYLAND GROUP 12

This group consists of deep, acid, sandy, alluvial soils along stream bottoms. These soils are loamy fine sands to sands that are rapidly permeable, are subject to overflow, and have a low available water capacity.

Soils of this group are used mostly for pasture. Common bermudagrass and Coastal bermudagrass are the main grasses.

Good pasture management includes proper stocking rates, fertilization in small frequent applications, rotational grazing, liming, and weed control. Well-managed hayland requires fertilization and cutting of the forage at the proper growth stage for maximum palatability and nutritional value. Care should be taken to cut hay at a height that does not damage the root system or impair plant vigor.

Use of Soils for Woodland [1]

Montgomery County soils are naturally suited to growing timber. Approximately 84 percent of the county is classified as commercial forest woodland. Of this, approximately 245,000 acres is in privately owned holdings of 1,000 acres or more. Less than 75,000 acres is owned by operating forest industries.

Good forest management is fairly common in the county. Severe insect and disease attacks seldom occur, and ice and snow damage is rare. The proportion of the forest area occupied by pines has increased during the past few years as a result of planting, natural reseeding, and timber stand maintenance. The substantial increases in volumes of sawlog-size trees reflects the sound forest management that woodland owners have practiced.

Though a great many areas already support adequate stands of pine, much of the forest land has less than its full capacity of growing stock, and growth volume is generally below potential.

A major obstacle to constructive forest management is encroachment of inferior hardwoods on sites best suited to pines. Effective control or utilization of the undesirable species would provide more favorable growing conditions for pine and ultimately result in greater production of pine.

Woodland suitability groups

This subsection gives information concerning the management of soils for production of wood crops. This information is based on field studies and evaluations, and on the experience and judgment of soil scientists, woodland conservationists, foresters, and local landowners. Soils that are similar have been placed in woodland suitability groups. Each woodland suitability group contains soils that (1) produce similar kinds of wood crops or perform about the same under similar kinds of woodland management, (2) require similar kinds of conservation treatment, and (3) have similar potential productivity. These groups, and the interpretations for each, are given in table 3.

Interpretations made in table 3 for each woodland suitability group of soils include interpretations that can be helpful to owners of woodland in (1) considering alternative uses of the soils, (2) in selecting the kinds of trees that will produce the best wood crops, and (3) in determining intensities of woodland management. The following paragraphs explain some of the terms used in the table.

Site index is the potential productivity of wood crops expressed as the average height, in feet, of the dominant and codominant species at the age of 50 years.

Erosion hazard is the potential erodibility of soils used for trees and depends to considerable degree on soil texture and slope. The hazard is *slight* if no special measures are needed. It is *moderate* if some precautions are needed to control erosion on access roads, logging trails, and constructed fire lanes. The hazard is *severe* if special treatments or methods are needed to control erosion caused by forest management practices or by logging facilities.

Equipment limitation refers to the restrictions or limitations in the use of equipment in harvesting or managing the tree crop as affected by soil wetness, rockiness or stoniness, slope, and texture of the surface layer. The rating is *slight* if use of equipment is not limited. It is *moderate* if there is a seasonal limitation of less than 3 months in use of equipment or if modified methods, modified equipment, or both, are needed to prevent damage to tree roots. Limitation is *severe* if specialized equipment or operations are needed, if there are seasonal restrictions of more than 3 months in the use of equipment, or if there is severe damage to tree roots unless equipment and methods used in managing or harvesting tree crops are modified.

Plant competition is the rate at which unwanted trees, shrubs, vines, or other plants invade when openings are made in the forest canopy. A rating of *slight* means that invading plants do not prevent adequate natural regeneration and early growth or interfere with the normal development of planted seedlings. Plant competition is *moderate* if it delays the establishment and initial growth of natural or planted seedlings, but it does not prevent the eventual development of a fully stocked, normal stand. It is *severe* if it prevents adequate restocking, either natural or planted, without intensive site preparation treatments, or special management practices, such as prescription burning, weeding, or use of chemicals.

Seedling mortality refers to the expected degree of mortality of seedlings, either natural or planted, as influenced by kinds of soil. A rating of *slight* means that less than 25 percent of the planted stock dies, or that adequate natural regeneration of the stand will take place. Mortality is *moderate* if 25 to 50 percent of planted stock will die, or that natural regeneration, without special treatment, is not always a reliable means of adequate restocking of the stand. It is *severe* if more than 50 percent of planted seedlings die, or if natural regeneration is not adequate and special seedbed preparation is needed.

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[1] This section prepared by EDWIN C. WILBUR, woodland conservationist, Soil Conservation Service.

Use of Soils for Woodland Grazing

This section interprets the grazing potential of the soils previously grouped according to their suitability for woodland. Under good management, these woodlands are capable of producing enough grasses, forbs, and woody plants to support varying numbers of cattle, varying numbers of deer, or both.

While livestock are grazed continually on some of the larger woodland tracts in Montgomery County, the length of the grazing period generally depends on the amount of grazing from other land in combination with woodland grazing.

Forage production in woodland fluctuates periodically as a result of the following factors: (1) age of stand, (2) number of trees per acre, (3) kinds of trees and shrubs, (4) depth and condition of pine straw, (5) control of undesirable woody species, and (6) condition of understory vegetation.

A major influence on the quantity and quality of forage production is the amount of light that forage plants receive during the growing season. Four canopy classes have been set up to take the light factor into account in determining stocking rates for the various woodland suitability groups. They are as follows:

Canopy classes:	*Approximate percentage of shaded ground at midday*
Open	0–20
Sparse	20–35
Medium	35–50
Dense	50–70

The soils of this county have been placed in five woodland grazing groups to help woodland owners make the maximum use of their woodland for grazing. Essentially, these are a grouping of those woodland suitability groups that require similar management practices if their grazing potential is to be realized.

WOODLAND GRAZING GROUP 1

This group consists of deep soils that are clay to sand in texture. These soils are frequently damaged by overflow and are poorly drained to somewhat excessively drained. This group contains the soils in woodland suitability groups 1 and 9.

If management is primarily for hardwoods, these soils produce very few shade-tolerant forage species. The more important forage species in well-managed stands are sedges, Virginia wildrye, giant cane, redtop panicum, and beaked panicum. These grasses make up 70 to 80 percent of the herbaceous understory. Carpetgrass now is dominant on a large part of the fine sandy loams. Saw-palmetto limits grazing in clayey areas. Hawthorn, honeylocust, holly, and similar woody plants in the understory reduce the grazing potential in some areas.

The potential production of herbaceous forage, in pounds per acre, air-dry weight, by canopy classes, is as follows: open canopy, 5,000 to 6,000; sparse canopy, 4,000 to 5,500; medium canopy, 2,000 to 3,500; dense canopy, 1,500 to 2,000.

WOODLAND GRAZING GROUP 2

This group consists of deep, poorly drained soils that have a loam or silt loam surface layer and silt loam or clay loam lower layers. During the wet, cool season, water stands on these soils for long periods. Production of herbaceous forage is limited by this wetness. This group contains the soils in woodland suitability group 2.

The most important forage plants are sedges, which make up 80 percent of the herbaceous understory. Riverflat hawthorn (May haw) is the dominant woody species that limits herbaceous forage production.

The potential production of herbaceous forage in pounds per acre, air-dry weight, by canopy classes is as follows: open canopy, 1,000 to 2,000; sparse canopy, 500 to 1,500; medium canopy, 500 to 1,000; dense canopy, 0 to 500.

WOODLAND GRAZING GROUP 3

This group consists of deep, somewhat poorly drained, moderately well drained to somewhat excessively drained soils that have fine sandy loam, loamy fine sand, and sandy clay loam surface layers. These soils have clay, sandy clay, sandy clay loam, fine sandy loam, or loamy fine sand to fine sand lower layers that are very slowly permeable to rapidly permeable. This group contains the soils in woodland suitability groups 3, 4, 6, 7, 8, and 11.

When the canopy is in excess of 50 percent, the dominant herbaceous plants are longleaf uniola, sedges, low panicums, beaked panicum, and purpletop. As the canopy decreases from 50 percent to 0, pinehill bluestem, Florida paspalum, slender indiangrass, purple lovegrass, beaked panicum, and brownseed paspalum are the dominant plants. These plants comprise 70 to 80 percent of the herbaceous vegetation.

Broomsedge bluestem is the principal invading grass under both open and closed canopy. Yankeeweed is the principal invading weed under an open canopy. The woody understory consists of southern waxmyrtle, yaupon, American beautyberry, sweetbay, hawthorn, viburnum, and numerous other woody shrubs and vines.

The potential production of herbaceous forage, in pounds per acre, air-dry weight, by canopy classes is, as follows: open canopy, 4,000 to 6,000; sparse canopy, 3,000 to 5,000; medium canopy, 2,000 to 4,000; dense canopy, 500 to 2,000.

WOODLAND GRAZING GROUP 4

This group consists of deep fine sandy loam soils that have sandy clay loam to clay lower layers. These soils are somewhat poorly drained to poorly drained and are very slowly to moderately slowly permeable. This group contains the soils in woodland suitability group 5.

Important herbaceous species are pinehill bluestem, indiangrass, longleaf uniola, purpletop, low panicums, and sedges. These plants make up 80 percent of the herbaceous vegetation. The woody understory consists of arrowwood viburnum, American beautyberry, greenbrier, and eastern hophornbeam.

The potential production of herbaceous forage, in pounds per acre, air-dry weight, by canopy classes, is as follows: open canopy, 3,000 to 4,500; sparse canopy, 2,000 to 3,500; medium canopy, 1,500 to 3,000; dense canopy, 500 to 1,000.

WOODLAND GRAZING GROUP 5

This group consists of fine sandy loam to clay soils that are very slowly permeable. This group contains the soils in woodland suitability group 10.

TABLE 3.—*Woodland suitability groups, potential productivity,*

[Absence of entry indicates that data is not available for estimating

Soil	Woodland suitability group	Number trees sampled	Potential productivity (site index)[1]		
			Loblolly pine	Shortleaf pine	Hardwood species
Bibb soils, frequently flooded. Bruno loamy fine sand. Osier-Chipley complex.	1	28	99±3	------------	90±10
Sorter silt loam. Tuckerman loam, heavy substratum. Waller loam.	2	121	84±6	------------	90±5
Albany fine sand. Boy fine sand. Chipley fine sand. Leefield loamy fine sand.	3	217	88±5	78±4	------------
Angie fine sandy loam. Hockley fine sandy loam. Segno fine sandy loam. Splendora fine sandy loam.	4	215	89±5	78±5	85±5
Crowley fine sandy loam. Edna-Katy complex. Katy fine sandy loam. Robertsdale fine sandy loam. Susquehanna fine sandy loam, 1 to 5 percent slopes. Susquehanna fine sandy loam, 5 to 12 percent slopes.	5	216	84±4	73±2	------------
Blanton fine sand, 0 to 5 percent slopes. Blanton fine sand, 5 to 12 percent slopes. Eustis loamy fine sand. Gunter fine sand.	6	227	82±5	68±4	------------
Fuquay loamy fine sand. Wicksburg loamy fine sand, 1 to 5 percent slopes. Wicksburg loamy fine sand, 5 to 12 percent slopes.	7	181	86±4	78±5	------------
Conroe gravelly loamy fine sand, 0 to 5 percent slopes. Conroe loamy fine sand, 0 to 5 percent slopes. Conroe loamy fine sand, 5 to 12 percent slopes. Sunsweet soils.	8	137	75±3	61±5	------------
Kaufman clay, frequently flooded. Kosse soils, frequently flooded. Trinity clay, frequently flooded. Trinity sandy clay loam, overwash. Tuscumbia clay, frequently flooded.	9	------------	------------	------------	100±5
Burleson clay. Garner clay. Houston Black clay. Kipling fine sandy loam, 1 to 3 percent slopes. Kipling soils, 0 to 1 percent slopes. Kipling clay loam, 1 to 3 percent slopes. Oktibbeha soils, 2 to 5 percent slopes, eroded.	10	63	76±5	65±5	------------
Fuquay loamy fine sand, terrace. Lucy loamy fine sand.	11	100	94±4	78±5	------------

[1] Average height of trees at 50 years of age.

and ratings for major limitations and hazards affecting management

site index or that the specified species is not commonly grown]

Other soil-related factors				Species priority
Erosion hazard	Equipment limitation	Plant competition	Seedling mortality	
Slight to moderate	Moderate to severe	Severe to moderate	Severe	Loblolly pine and lowland hardwoods.
Slight	Severe	Severe	Severe	Loblolly pine, slash pine, water oaks.
Slight	Slight to moderate	Moderate	Moderate	Loblolly pine.
Slight	Slight to moderate	Moderate	Slight to moderate	Loblolly pine, sweetgum, red and white oaks.
Slight to moderate	Moderate to severe	Moderate	Moderate to severe	Loblolly pine.
Slight	Moderate	Moderate	Moderate	Loblolly pine, shortleaf pine.
Slight	Moderate	Moderate	Moderate	Loblolly pine, shortleaf pine.
Slight	Slight	Slight	Slight	Loblolly pine, shortleaf pine.
Slight	Moderate to severe	Severe	Severe	Lowland hardwoods.
Slight	Moderate	Slight	Moderate	Loblolly pine.
Slight	Moderate	Moderate	Moderate	Loblolly pine, shortleaf pine.

Important herbaceous species are little bluestem, big bluestem, indiangrass, side-oats grama, Florida paspalum, and perennial legumes. These plants make up 80 percent of the herbaceous vegetation. The woody understory vegetation consists of hawthorn, honeylocust, winged-elm, Osage-orange, and greenbrier.

The potential production of herbaceous forage, in pounds per acre, air-dry weight, by canopy classes, is as follows: open canopy, 5,000 to 7,000; sparse canopy, 4,000 to 6,000; medium canopy, 2,000 to 3,500; dense canopy, 500 to 1,000.

Use of the Soils for Wildlife [2]

The soils of Montgomery County provide a wide variety of habitats that support many forms of wildlife. The low sandy hills in the northern and eastern parts of the county are covered with pine-hardwoods timber. An interrupted belt of open blackland prairie extends from the west central side to the northeast corner of the county. The southern part is mainly a broad, flat, featureless, timbered plain. It is known as the flatwoods section and is interspersed with many natural wet areas. Bottom-land soils that occur along Lake Creek and the West Fork of the San Jacinto River provide excellent hardwood-timber habitat.

Deer, fox, squirrel, bobwhite quail, and mourning dove are the major game animals and birds inhabiting the county. Numerous species of songbirds and furbearers and other small animals live here also. Most ponds and lakes have been stocked with largemouth black bass, channel catfish, and one or more species of sunfish. Many species of ducks spend the winter on these impoundments and on natural waters in the county.

Description of wildlife sites

The soils of this county have been grouped in four wildlife sites, each of which contains one or more soil associations. These soil associations are shown on the general soil map at the back of this soil survey and are described in the section "General Soil Map." Each wildlife site is unique in topography, productivity, kinds and amounts of vegetation, and abundance of wildlife.

Described in the following pages are the wildlife sites in this county.

1. PINE-HARDWOODS WILDLIFE SITE

This site consists of soil associations 1, 3, 6, and 8 on the "General Soil Map." It is mostly in timber, though there are scattered small clearings of crops or pasture and small lakes or ponds. The timber is shortleaf and loblolly pine, hickory, oak, and gum. The understory is shrubs and vines, such as yaupon, American beautyberry, haws, holly, dogwood, waxmyrtle, wild grape, yellow jessamine, Alabama supplejack, and greenbrier. Herbaceous vegetation, sparse under timber and dense in openings, is made up mainly of little bluestem, indiangrass, eastern gamagrass, sand lovegrass, longleaf uniola, and annual weeds, grasses, and legumes. Deer, squirrel, cottontail rabbit, and furbearers are abundant over most of this site. Dove and quail are abundant around cultivated areas and woodland openings. The heaviest deer population occurs in the southwest part of the county on this site.

2. FLATWOODS WILDLIFE SITE

This site consists of associations 2 and 4 on the "General Soil Map." It is a relatively level site that has numerous naturally wet areas, which in some instances have no timber. The broad wet areas are mainly hardwood areas that contain scattered pine. The slight ridges between the broad wet areas contain pine stands and scattered hardwoods. The understory in the wetter areas is composed of sedges and grasses, but in the higher areas there is a heavy understory of American beautyberry, hornbeam, winged-elm, berry vines, and sprouts and saplings of red oak, maple, gum, and magnolia. This is normally the best site in the county for furbearers. It has a good squirrel population but a low deer population.

3. BLACKLAND WILDLIFE SITE

This prairie site is composed of association 5 on the "General Soil Map." About 85 percent of this site is still open land, either in cultivated fields, abandoned fields, improved pasture, or native rangeland. About 15 percent of the area has a tree cover of red oak, post oak, blackjack oak, white oak, pecan, elm, and loblolly and shortleaf pine. An understory of briers, yaupon, American beautyberry, berry vines, haws, and tree sprouts is present. Native herbaceous vegetation consists of little bluestem, indiangrass, silver bluestem, and various species of panicums, paspalums, legumes, and weeds. This site is good mourning dove and bobwhite quail range. It has a fair population of cottontail rabbits and jackrabbits. The timbered part provides fair squirrel and furbearer habitat.

4. BOTTOMLAND WILDLIFE SITE

Association 7 on the "General Soil Map," makes up this site. Willow and water oak, rock elm, hackberry, sweetgum, ash, and pine are the major trees on this site. In the understory are haws, hornbeam, blue beech, yaupon, palmetto, berry vines, giant cane, longleaf uniola, sedges, annual grasses, and weeds. The major wildlife species are squirrel, deer, furbearers, swamp rabbit, and duck. This site has the highest squirrel and swamp rabbit population in the county.

Management of soils for wildlife

Dove and quail require a year-round supply of food, such as seed from weeds, grasses, legumes, small grains, and sorghum. Quail also eat large numbers of insects in spring and summer. Lightly tilling such soils as the Bibb, Blanton, Wicksburg, and Houston Black, stimulates growth of those annual weeds, grasses, and legumes that produce high-quality food for these birds. Crops, such as millet, rye, or sunflowers, may be planted on these same soils to produce a seed crop for game birds. Quail need low-growing shrubs to provide shade, dusting and loafing areas, and escape cover from predators. Overgrown fence rows and field borders provide food, cover, and a protected trail for birds to move from one area to another. Native shrubs that furnish good quail cover, such as greenbrier, plum, and berry vines, may need fencing and protection from livestock grazing if they are to make desired growth.

[2] This section prepared by VERNON HICKS, biologist, Soil Conservation Service.

Deer prefer a diet of legumes, weeds, vines, some grasses and leaves, twigs, buds, and fruits of various shrubs and trees. Deer also feed extensively on winter-growing small grain and legumes, such as oats and vetch, when they are available. Habitat for deer is greatly improved if native plants are not overgrazed through overstocking. Soils such as the Houston Black, Trinity, Oktibbeha, Albany, and Blanton can be planted to winter-growing small grain or legumes to provide additional deer food. Such plantings should be adjacent to wooded areas or in woodland clearings so that grazing deer are near escape cover.

Ducks frequently use the ponds, lakes, natural wet areas, flowing streams, and flooded bottom lands during fall and winter. They feed mainly on the seeds of native plants such as barnyard grass, smartweeds, and various podweeds that grow in the shallow parts of ponds and natural lakes and along streambanks. They also eat a large quantity of acorns and other mast provided by trees growing on flooded bottom land and flatwood areas. Management should be aimed at increasing these food plants and at manipulating the water level to winter flood additional flatwood areas and thus make available a greater food supply for waterfowl.

Fish adapted to waters in the county are largemouth black bass, channel catfish, and sunfish. A pond or lake that is constructed without shallow areas is best for raising fish. Shallow areas encourage the growth of aquatic plants which harbor too many small sunfish and cause a pond to become overstocked. Management should be directed at providing a large amount of food for forage fish, such as redear sunfish, which in turn furnish food for the bass. Fertilizer, applied correctly in a properly constructed pond, stimulates the growth of microscopic plants and animals that shade the bottom of the pond and prohibit the growth of plants. Fertilized ponds normally produce more usable size fish than unfertilized ponds.

Each species of wildlife has a definite requirement for food, cover, and water. If any one or combination of these requirements is lacking, the wildlife population diminishes or disappears. The soils in each wildlife site are capable of producing certain plants for food and cover for wildlife. Information on developing wildlife habitats and managing fishponds can be obtained from technicians of the Soil Conservation Service who give assistance to the Montgomery-Walker Soil and Water Conservation District, from the Texas Agricultural Extension Service, and from the Texas Parks and Wildlife Department.

Engineering Uses of Soils [3]

This section provides information of special interest to engineers, contractors, farmers, and others who use soil as structural material or as foundation material. The text and tables describe those properties of soil that affect construction and maintenance of roads, airports, pipelines, building foundations, water storage facilities, erosion control structures, drainage systems, cemeteries, sewage disposal systems, and recreational enterprises. Important soil properties in engineering include permeability, shear strength, density, shrink-swell potential, water-holding capacity, grain-size distribution, plasticity, and reaction.

Information concerning these and related soil properties is furnished in tables 4, 5, 6, and 7. The estimates and interpretations of soil properties in these tables can be used in—

1. Planning and designing drainage systems, farm ponds, irrigation systems, diversion terraces, and other structures for controlling water and conserving soil.
2. Selecting potential locations for highways, airports, pipelines, and underground cables.
3. Locating probable sources of sand, gravel, or rock suitable for use as construction material.
4. Selecting potential industrial, commercial, residential, and recreational areas.

Engineering interpretations reported here do not replace the need for sampling and testing at the site of each specific construction project. Special care should be taken in gathering and evaluating soil data for projects involving potential heavy loads or excavations to greater depths than are covered in these tables. Even in these situations, however, the soil map is useful in planning more detailed field investigations and for indicating the kinds of problems that may be expected.

Some terms used by soil scientists may be unfamiliar to engineers. Other words have meaning in soil science different from their meaning in engineering. Among the terms that have special meaning in soil science are gravel, sand, silt, clay, loam, surface soil, subsoil, and horizon. These and other terms are defined in the Glossary at the back of this survey.

Engineering classification of the soils

The two systems most commonly used in classifying samples of soil horizons for engineering are the AASHO system (*1*)[4] adopted by the American Association of State Highway Officials, and the Unified system (*9*) used by the SCS engineers, Department of Defense, and others.

The AASHO system is used to classify soils according to those properties that affect use in highway construction. In this system, a soil is placed in one of seven basic groups ranging from A–1 through A–7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A–1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme is group A–7, clay soils that have low strength when wet and are the poorest for subgrade. Where laboratory data are available to justify a further breakdown, the A–1, A–2, and A–7 groups are divided as follows: A–1–a, A–1–b, A–2–4, A–2–5, A–2–6, A–2–7, and A–7–5, A–7–6. If soil material is near a classification boundary, it is given a symbol showing both classes; for example, A–2 or A–4. Within each group, the relative engineering value of a soil material can be indicated by a group index number. Group indexes range from 0 for the best material to 20 for the poorest. The AASHO classification for tested soils, with index numbers in parentheses, is shown in table 6; the estimated classification for all soils mapped in the survey area is given in table 4.

[3] This section by JOE T. SANDERS, civil engineer, Soil Conservation Service.

[4] Italic numbers in parentheses refer to Literature Cited, page 67.

TABLE 4.—*Estimated engineering*

[The symbol > means greater than,

Soil series and map symbols	Hydrologic group	Corrosivity uncoated steel	Water table: Depth from surface	Water table: Duration	Depth from surface	Classification: USDA texture
			Inches	*Months per year*	*Inches*	
Albany: Ab	C	Moderate	30–60	1–2	0–47 47–83	Fine sand Fine sandy loam
Angie: An	C	High	15–30	1–2	0–17 17–23 23–53 53–72	Fine sandy loam Sandy clay loam Sandy clay Sandy clay loam
Bibb: Bb	D	High	0–15	2–6	0–63	Very fine sandy loam
Blanton: BlC, BlD	A	Low	>120	12	0–90	Fine sand
Boy: Bo	A	Low	30–60	1–2	0–47 47–70	Fine sand and loamy fine sand Light sandy clay loam
Bruno: Br	A	Low	30–60	1–2	0–84 84–96	Loamy sand Sand
Burleson: Bu	D	High	>120	12	0–50	Clay
Chipley: Ch	C	Moderate	30–60	2–6	0–80	Fine sand
Conroe:						
CnC	B	High	30–60	1–2	0–25 25–47 47–78 78–96	Gravelly loamy fine sand Sandy clay Sandy clay Sandy clay loam
CoC, CoD	C	High	30–60	1–2	0–24 24–27 27–75	Loamy fine sand Sandy clay loam Clay
Crevasse: Cr	A	Low	30–60	1–2	0–63	Sand
Crowley: Cw	D	High	15–30	1–2	0–15 15–56 56–68 68–80	Fine sandy loam Clay Clay Sandy clay
Edna: Ek For Katy part of Ek, see Katy series.	D	High	15–30	1–2	0–9 9–48 48–63	Fine sandy loam Clay Clay
Eustis: Eu	A	Low	>120	12	0–63	Loamy fine sand
Ferris: FcC2, FcD2, FgD Gullied land in FgD not rated.	D	High	>120	12	0–63	Clay
Fuquay: Fs, Ft	B	Low	30–60	<1	0–23 23–80	Loamy fine sand Sandy clay loam
Garner: Ga	D	High	>120	12	0–60	Clay
Gunter: Gu	A	Low	30–60	<1	0–46 46–57 57–75	Fine sand Sandy loam Sandy clay loam
Hockley: Ho	C	Moderate	30–60	1–2	0–32 32–63	Fine sandy loam Sandy clay loam
Houston Black: Hs	D	High	>120	12	0–60	Clay
Katy: Ka	C	High	30–60	1–2	0–34 34–63	Fine sandy loam Clay
Kaufmann: Kc	D	High	60–120	2–6	0–63	Clay

See footnote at end of table.

properties of the soils

and the symbol < means less than]

Classification—Continued		Percentage passing sieve			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4	No. 10	No. 200				
					Inches per hour	*Inches per inch of soil*	*pH*	
SM	A-2-4	100	98–100	20–35	6. 3–20. 0	0. 05–0. 10	5. 1–6. 5	Low.
SM or ML	A-4	100	98–100	40–55	0. 63–2. 0	0. 05–0. 10	4. 5–5. 5	Low
SM or ML	A-4	98–100	98–100	40–55	0. 63–2. 00	0. 10–0. 15	5. 6–6. 5	Low.
SC or CL	A-6	100	100	35–55	0. 20–0. 63	0. 10–0. 15	5. 1–6. 0	Low.
CL or SC	A-7	100	100	45–60	0. 06–0. 20	0. 15–0. 20	4. 5–5. 5	Moderate.
SC or CL	A-6	100	100	35–55	0. 20–0. 63	0. 15–0. 20	4. 5–5. 5	Low.
ML	A-4	100	100	50–65	0. 63–2. 00	0. 10–0. 15	4. 5–5. 5	Low.
SM or SW–SM	A-2-4 or A-3	100	100	5–15	6. 3–2. 0	0. 05–0. 10	4. 5–6. 5	Low.
SM	A-2-4	98–100	98–100	15–30	6. 3–20. 0	0. 05–0. 10	4. 5–6. 5	Low.
CL or SC	A-6	100	100	35–55	0. 20–0. 63	0. 10–0. 15	4. 5–5. 5	Low.
SM	A-2-4	100	100	15–30	6. 3–20. 0	0. 05–0. 10	4. 5–6. 5	Low.
SM or SW–SM	A-2-4 or A-3	100	100	5–15	6. 3–20. 0	0. 05–0. 10	4. 5–6. 5	Low.
CH	A-7	98–100	98–100	75–95	<0. 06	0. 15–0. 20	6. 1–8. 4	High.
SM	A-2-4	100	100	20–35	6. 3–20. 0	0. 05–0. 10	4. 5–6. 5	Low.
GM or SM–SC	A-1-b	53–83	55–69	14–21	2. 0–6. 30	0. 10–0. 15	4. 5–6. 0	Low.
SC	A-7	75–85	70–80	35–45	0. 06–0. 20	0. 15–0. 20	4. 5–5. 5	Low.
CL or SC	A-7	90–100	85–95	47–60	0. 06–0. 20	0. 15–0. 20	4. 5–5. 5	Low.
SC	A-6	100	100	35–45	0. 20–0. 63	0. 10–0. 15	4. 5–5. 0	Low.
SM	A-2-4	85–95	75–85	15–30	2. 0–6. 30	0. 10–0. 15	4. 5–6. 0	Low.
SC	A-6	70–80	65–75	35–45	0. 20–0. 63	0. 15–0. 20	4. 5–5. 0	Low.
CL or SC	A-7	90–100	85–95	45–60	0. 06–0. 20	0. 15–0. 20	4. 5–5. 0	Low.
SP–SM or SM	A-3 or A-2-4	98–100	98–100	5-15	6. 3–20. 0	<. 05	5. 1–6. 5	Low.
SM or ML	A-4	100	100	40–55	0. 63–2. 00	0. 10–0. 15	4. 5–6. 5	Low.
CH	A-7	100	100	75–95	<0. 06	0. 15–0. 20	4. 5–6. 5	High.
CH	A-7	100	100	75–95	<0. 06	0. 15–0. 20	5. 1–7. 3	High.
CL	A-7	100	100	50–65	0. 06–0. 20	0. 15–0. 20	5. 1–7. 3	Moderate.
SM or ML	A-4	98–100	98–100	40–55	0. 6–2. 0	0. 10–0. 15	5. 1–6. 5	Low.
CH	A-7	98–100	98–100	75–95	<0. 06	0. 15–0. 20	5. 1–6. 5	High.
CH	A-7	98–100	98–100	75–95	<0. 06	0. 20–0. 25	6. 1–7. 8	High.
SM	A-2-4	100	100	15–30	6. 3–20. 0	0. 5–0. 10	5. 1–6. 5	Low.
CH	A-7	95–100	95–100	75–95	<0. 06	0. 18–0. 20	7. 9–8. 4	High.
SM–SC	A-2-4	98–100	98–100	15–30	6. 30–20. 0	0. 10–0. 15	4. 5–6. 5	Low.
SC or CL	A-6	98–100	98–100	35–55	0. 63–2. 00	0. 10–0. 15	4. 5–5. 5	Low.
CH	A-7	100	98–100	75–95	<0. 06	0. 15–0. 20	5. 6–7. 8	High.
SM or SW–SM	A-3 or A-2-4	98–100	98–100	5–15	6. 30–20. 0	0. 05–0. 10	4. 5–6. 5	Low.
SM	A-2 or A-4	98–100	98–100	30–40	2. 00–6. 30	0. 10–0. 15	4. 5–5. 5	Low.
SC or CL	A-6	100	100	35–55	0. 63–2. 0	0. 10–0. 15	4. 5–5. 5	Low.
SM or ML	A-4	98–100	98–100	40–55	2. 00–6. 30	0. 10–0. 15	5. 1–6. 0	Low.
SC or CL	A-6	98–100	98–100	35–55	0. 20–0. 63	0. 15–0. 20	5. 1–6. 0	Low.
CH	A-7	95–100	95–100	75–95	<0. 06	0. 15–0. 20	7. 9–8. 4	High.
SM or ML	A-4	98–100	98–100	40–55	2. 00–6. 30	0. 10–0. 15	4. 5–6. 0	Low.
CL or SC	A-7	98–100	98–100	45–60	<0. 06	0. 15–0. 20	5. 6–6. 5	Low.
CH	A-7	100	100	75–95	<0. 06	0. 15–0. 20	6. 1–8. 4	High.

TABLE 4.—*Estimated engineering*

Soil series and map symbols	Hydrologic group	Corrosivity uncoated steel	Water table: Depth from surface	Water table: Duration	Depth from surface	Classification: USDA texture
			Inches	*Months per year*	*Inches*	
Kipling: KlB, KnA [1]	D	High	>120	12	0–7	Fine sandy loam
					7–35	Clay
					35–48	Sandy clay
KpB	D	High	>120	12	0–7	Clay loam
					7–50	Clay
Kosse: Ks	D	Moderate	30–60	2–6	0–48	Clay loam
Leefield: Le	C	Moderate	15–30	2–6	0–34	Loamy fine sand
					34–40	Fine sandy loam
					40–65	Sandy clay loam
Lucy: Lu	A	Low	>120	12	0–23	Loamy fine sand
					23–76	Sandy clay loam
					76–86	Fine sand
Oktibbeha: ObC2	D	High	>120	12	0–4	Clay loam
					4–20	Clay
					20–60	Clay
Osier: Oc	D	Moderate	15–30	6–12	0–63	Sand
For Chipley part of Oc, see Chipley series.						
Robertsdale: Ro	C	Moderate	15–30	2–6	0–27	Fine sandy loam
					27–60	Sandy clay loam
Segno: Se	C	Moderate	30–60	1–2	0–14	Fine sandy loam
					14–85	Sandy clay loam
Sorter: So	D	High	15–30	2–6	0–79	Silt loam
					79–110	Fine sandy loam and very fine sandy loam.
Splendora: Sp	C	High	15–30	2–6	0–10	Fine sandy loam
					10–22	Loam
					22–95	Sandy clay loam
Sunsweet: Ss	C	Moderate	>120	12	0–5	Sandy clay loam
					5–21	Sandy clay
					21–52	Sandy clay
					52–70	Sandy clay loam
Susquehanna: SuC, SuD	D	High	>120	12	0–9	Fine sandy loam
					9–26	Clay
					26–38	Clay
					38–48	Sandy clay
					48–84	Clay loam, sandy clay, and fine sandy loam.
					84–100	Fine sandy loam, loamy fine sand, and sandy clay loam.
Trinity: Tc	D	High	60–120	6–12	0–60	Clay
Th	D	High	60–120	2–6	0–24	Sandy clay loam
					24–63	Clay
Tuckerman: Tk	D	High	0–15	2–6	0–15	Loam
					15–37	Clay loam
					37–64	Clay
					64–78	Clay
Tuscumbia: Tu	D	High	15–30	2–6	0–63	Clay

See footnote at end of table.

properties of the soils—Continued

Classification—Continued		Percentage passing sieve			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4	No. 10	No. 200				
					Inches per hour	*Inches per inch of soil*	*pH*	
ML or SM	A-4	98-100	98-100	40-55	0. 63-2. 00	0. 10-0. 15	5. 6-6. 5	Low.
CH	A-7	98-100	98-100	75-95	<0. 06	0. 15-0. 20	4. 5-6. 0	High.
CL or SC	A-7	98-100	98-100	45-60	<0. 06	0. 10-0. 15	6. 6-8. 4	Moderate.
ML-CL	A-6	98-100	98-100	70-80	0. 06-0. 20	0. 15-0. 20	5. 6-6. 5	Moderate.
CH	A-7	100	100	75-95	<0. 06	0. 15-0. 20	5. 6-8. 4	High.
ML-CL	A-6	98-100	98-100	70-80	0. 63-2. 0	0. 10-0. 15	5. 6-7. 8	Low.
SM	A-2-4	100	100	15-30	2. 00-6. 30	0. 05-0. 10	4. 5-5. 5	Low.
SM or ML	A-4	100	100	40-55	0. 63-2. 00	0. 10-0. 15	4. 5-5. 5	Low.
SC or CL	A-6	100	100	35-55	0. 20-0. 63	0. 10-0. 15	4. 5-5. 5	Low.
SM	A-2-4	100	100	15-30	2. 00-6. 30	0. 05-0. 10	5. 1-6. 5	Low.
SC or CL	A-6	100	100	35-55	0. 63-2. 00	0. 15-0. 20	4. 5-5. 5	Low.
SM	A-2-4	100	100	20-35	6. 30-20. 0	0. 05-0. 10	4. 5-5. 5	Low.
ML-CL	A-6	98-100	98-100	70-80	0. 6-0. 20	0. 15-0. 20	5. 6-6. 5	Moderate.
CH	A-7	100	98-100	75-90	<0. 06	0. 15-0. 20	4. 5-6. 5	High.
CH	A-7	100	98-100	75-90	<0. 06	0. 15-0. 20	6. 1-8. 4	High.
SM or SW-SM	A-2-4	100	100	5-15	6. 3-20. 0	<. 05	4. 5-5. 0	Low.
SM or ML	A-4	95-100	90-98	40-55	0. 63-2. 00	0. 10-0. 15	5. 1-6. 5	Low.
SC or CL	A-6	75-95	65-90	35-55	0. 20-0. 63	0. 05-0. 10	4. 5-5. 5	Low.
SM or ML	A-4	100	100	35-55	0. 63-2. 00	0. 10-0. 15	4. 5-6. 5	Low.
SC or CL	A-6	80-95	80-95	40-55	0. 20-0. 63	0. 10-0. 15	4. 5-6. 0	Low.
ML or ML-CL	A-4	100	99-100	65-80	0. 06-0. 20	0. 15-0. 20	4. 5-6. 5	Low.
SM or ML	A-4	100	95-100	40-55	0. 06-0. 20	0. 10-0. 15	6. 1-7. 3	Low.
SM or ML	A-4	98-100	98-100	40-55	0. 63-2. 00	0. 10-0. 15	5. 1-6. 5	Low.
ML	A-4	98-100	95-100	50-65	0. 63-2. 00	0. 10-0. 15	4. 5-6. 5	Low.
CL	A-6	90-100	90-100	50-60	0. 20-0. 63	0. 05-0. 10	4. 5-5. 5	Low.
SC or CL	A-6	75-90	70-85	35-55	0. 20-0. 63	0. 15-0. 20	4. 5-5. 5	Low.
SC	A-7	75-85	70-80	35-45	0. 20-0. 63	0. 15-0. 20	4. 5-5. 5	Low.
CL or SC	A-7	90-100	85-95	47-60	0. 20-0. 63	0. 15-0. 20	4. 5-5. 5	Low.
SC	A-6	100	100	35-45	0. 20-0. 63	0. 15-0. 20	4. 5-5. 5	Low.
SM or ML	A-4	100	100	40-55	0. 63-2. 00	0. 10-0. 15	4. 5-5. 5	Low.
CH	A-7	100	100	60-70	<0. 06	0. 15-0. 20	4. 5-5. 5	High.
CL	A-7	100	100	50-70	<0. 06	0. 15-0. 20	4. 5-5. 5	Moderate.
SC	A-7	100	100	40-50	0. 06-0. 20	0. 15-0-20	4. 5-5. 5	Moderate.
SC	A-2 or A-6	100	100	30-40	0. 20-0. 63	0. 15-0. 20	4. 5-5. 5	Low.
SM	A-2 or A-6	100	100	30-40	0. 63-2. 00	0. 10-0. 15	4. 5-5. 5	Low.
CH	A-7	100	98-100	75-95	0. 06-0. 20	0. 20-0. 25	7. 4-8. 4	High.
SC or CL	A-6	100	100	35-55	0. 20-0. 63	0. 15-0. 20	7. 4-8. 4	Moderate.
CH	A-7	100	98-100	75-95	0. 06-0. 20	0. 20-0. 25	7. 4-8. 4	High.
ML or ML-CL	A-4	100	100	65-75	0. 20-0. 63	0. 10-0. 15	4. 5-6. 0	Low.
ML-CL	A-6	100	100	55-75	0. 06-0. 20	0. 15-0. 20	4. 5-6. 0	Moderate.
CH	A-7	100	100	75-95	0. 06-0. 20	0. 15-0. 20	4. 5-6. 0	High.
CL	A-7	100	100	55-70	0. 06-0. 20	0. 15-0. 20	4. 5-7. 8	Moderate.
CH	A-7	100	100	75-95	<0. 06	0. 15-0. 20	5. 6-7. 3	High.

TABLE 4.—*Estimated engineering*

Soil series and map symbols	Hydrologic group	Corrosivity uncoated steel	Water table: Depth from surface	Water table: Duration	Depth from surface	Classification: USDA texture
			Inches	*Months per year*	*Inches*	
Waller:						
Wa	D	High	15–30	2–6	0–34 34–53	Loam Clay loam
We	D	High	0–15	6–12	0–3 3–50 50–65	Fine sandy loam Loam Clay loam
Wicksburg: WkC, WkD	B	Moderate	>120	12	0–29 29–72 72–82	Loamy fine sand Sandy clay and clay Sandy clay loam

[1] (KnA) mapped as Kipling soils is a mixture of fine sandy loam and clay loam; approximately 50 percent is each texture.

TABLE 5.—*Interpretations of*

Soil series and map symbols	Suitability as source of—: Topsoil	Sand	Road fill	Degree of limitations and soil features affecting—: Highway location
Albany: Ab	Poor: low productivity.	Fair: poor grain-size distribution.	Fair: 40 to 60 inches of material.	Moderate: somewhat poorly drained.
Angie: An	Fair: thickness of material.	Poor: excessive fines	Fair: moderate traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.
Bibb: Bb	Fair: moderate productivity.	Fair: excessive fines	Poor: poorly drained	Severe: flood hazard; high water table.
Blanton: BlC, BlD	Poor: low productivity.	Fair: poor grain-size distribution.	Good	Slight
Boy: Bo	Poor: low productivity.	Fair: poor grain-size distribution.	Fair: 40 to 60 inches of material.	Moderate: moderately well drained.
Bruno: Br	Poor: low productivity.	Fair: poor grain-size distribution.	Good	Severe: flood hazard
Burleson: Bu	Poor: clay texture	Unsuitable: excessive fines.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poor traffic-supporting capacity.
Chipley: Ch	Poor: low productivity.	Fair: poor grain-size distribution.	Fair: moderately well drained.	Moderate: moderately well drained.
Conroe: CoC, CoD, CnC	Poor: low productivity.	Fair: excessive fines.	Good	Slight

properties of the soils—Continued

Classification—Continued		Percentage passing sieve			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4	No. 10	No. 200				
					Inches per hour	*Inches per inch of soil*	*pH*	
ML	A-4	100	100	60-75	0. 63-2. 00	0. 15-0. 20	4. 5-5. 5	Low.
CL	A-6 or A-7	95-100	95-100	70-80	<0. 06	0. 15-0. 20	5. 6-7. 3	Low.
ML or SM	A-4	100	100	40-55	0. 63-2. 00	0. 10-0. 15	4. 5-5. 5	Low.
CL or ML	A-4	100	100	60-75	0. 63-2. 00	0. 10-0. 15	4. 5-5. 5	Low.
CL	A-6 or A-7	100	100	70-80	<0. 06	0. 15-0. 20	5. 6-7. 3	Low.
SM	A-2-4	100	100	15-30	2. 00-6. 30	0. 05-0. 10	5. 0-6. 5	Low.
CL or SC	A-7	100	100	45-60	0. 06-0. 20	0. 15-0. 20	4. 5-6. 0	Low.
CL or SC	A-6	100	100	35-55	0. 20-0. 63	0. 15-0. 20	4. 5-5. 5	Low.

engineering properties of the soils

Degree of limitations and soil features affecting—Con.		Soil features adversely affecting—		
Farm ponds		Agricultural drainage	Irrigation	Small farms and gardens
Reservoir area	Embankments			
Moderate: moderate permeability.	Moderate: fair stability; poor resistance to piping and erosion.	All features favorable	Low available water capacity; rapid intake rate.	Droughty.
Slight	Moderate: medium compressibility.	All features favorable	All features favorable	All features favorable.
Moderate: moderate permeability.	Moderate: fair stability; poor resistance to piping and erosion.	Flood hazard	Flood hazard	Flood hazard.
Severe: rapid permeability.	Severe: poor stability; poor resistance to piping and erosion.	All features favorable	Low available water capacity; rapid intake rate.	Droughty.
Moderate: moderately slow permeability.	Moderate: poor resistance to piping and erosion; fair stability.	All features favorable	Low available water capacity; rapid intake rate.	Droughty.
Severe: rapid permeability.	Severe: poor stability; poor resistance to piping and erosion.	Flood hazard	Flood hazard	Flood hazard.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	Clayey; droughty.
Severe: rapid permeability.	Severe: poor stability; poor resistance to piping and erosion.	All features favorable	Low available water capacity.	All features favorable.
Slight	Slight	All features favorable	All features favorable	Low productivity.

TABLE 5.—*Interpretations of*

Soil series and map symbols	Suitability as source of—			Degree of limitations and soil features affecting—
	Topsoil	Sand	Road fill	Highway location
Crevasse: Cr	Poor: low productivity.	Good	Good	Severe: flood hazard
Crowley: Cw	Fair: thickness of material.	Poor: excessive fines	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poor traffic-supporting capacity; poorly drained.
Edna: Ek. For Katy part of Ek, see Katy series.	Fair: thickness of material.	Poor: excessive fines	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poorly drained; poor traffic-supporting capacity.
Eustis: Eu	Poor: low productivity.	Fair: excessive fines	Good	Slight
Ferris: FcC2, FcD2, FgD	Poor: clay texture	Unsuitable: excessive fines.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poor traffic-supporting capacity.
Fuquay: Fs, Ft	Poor: sandy texture	Fair: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.
Garner: Ga	Poor: clay texture	Unsuitable: excessive fines.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poor traffic-supporting capacity.
Gunter: Gu	Poor: low productivity.	Fair: excessive fines	Good	Slight
Hockley: Ho	Good	Poor: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.
Houston Black: Hs	Poor: clay texture	Unsuitable: excessive fines.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poor traffic-supporting capacity.
Katy: Ka	Good	Poor: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity; somewhat poorly drained.
Kaufman: Kc	Poor: clay texture	Poor: excessive fines	Poor: high shrink-swell potential.	Severe: flood hazard; high shrink-swell potential; poor traffic-supporting capacity.
Kipling: KlB, KnA, KpB	Fair: thickness of material.	Poor: excessive fines	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poor traffic-supporting capacity.
Kosse: Ks	Fair: clay loam texture.	Poor: excessive fines	Fair: fair traffic-supporting capacity.	Flood hazard
Leefield: Le	Poor: low productivity.	Fair: excessive fines	Fair: somewhat poorly drained.	Moderate: fair traffic-supporting capacity; somewhat poorly drained.
Lucy: Lu	Poor: low productivity.	Fair: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.
Oktibbeha: ObC2	Poor: clay texture	Unsuitable: excessive fines.	Poor: poor traffic-supporting capacity; high shrink-swell potential.	Severe: poor traffic-supporting capacity; high shrink-swell potential.

engineering properties of the soils—Continued

Degree of limitations and soil features affecting—Con.		Soil features adversely affecting—		
Farm ponds		Agricultural drainage	Irrigation	Small farms and gardens
Reservoir area	Embankments			
Severe: rapid permeability.	Severe: poor stability; poor resistance to piping and erosion.	Flood hazard	Flood hazard	Flood hazard.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	Water table.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	Water table.
Severe: rapid permeability.	Severe: poor resistance to piping and erosion.	All features favorable	Low available water capacity.	Low productivity.
Slight	Moderate: high compressibility.	All features favorable	Very slow permeability	Clayey; droughty.
Moderate: moderate permeability.	Moderate: fair stability	All features favorable	All features favorable	All features favorable.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	Clayey; droughty.
Moderate: moderate permeability.	Moderate: fair stability; poor resistance to piping and erosion.	All features favorable	Low available water capacity.	Low productivity.
Moderate: moderately slow permeability.	Moderate: fair stability	All features favorable	All features favorable	All features favorable.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	Droughty; clayey.
Slight	Moderate: fair stability	All features favorable	All features favorable	All features favorable.
Slight	Moderate: high compressibility.	Flood hazard; very slow permeability.	Flood hazard; very slow permeability.	Flood hazard.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	All features favorable.
Moderate: moderate permeability.	Moderate: fair stability	Flood hazard	Flood hazard	Flood hazard.
Moderate: moderately slow permeability.	Moderate: fair stability	All features favorable	All features favorable	Water table.
Moderate: moderate permeability.	Moderate: fair stability	All features favorable	All features favorable	All features favorable.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	Clayey; droughty.

TABLE 5.—*Interpretations of*

Soil series and map symbols	Suitability as source of—			Degree of limitations and soil features affecting—
	Topsoil	Sand	Road fill	Highway location
Osier: Oc For Chipley part of Oc, see Chipley series.	Poor: low productivity.	Fair: poor grain-size distribution.	Poor: poorly drained.	Severe: poorly drained
Robertsdale: Ro	Fair: thickness of material.	Poor: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity; somewhat poorly drained.
Segno: Se	Fair: thickness of material.	Poor: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.
Sorter: So	Poor: poorly drained	Poor: excessive fines	Poor: poorly drained	Severe: poorly drained.
Splendora: Sp	Fair: thickness of material.	Poor: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity; somewhat poorly drained.
Sunsweet: Ss	Poor: low productivity.	Poor: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.
Susquehanna: SuC, SuD	Fair: thickness of material.	Poor: excessive fines	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poor traffic-supporting capacity.
Trinity: Tc, Th	Poor: clay texture	Unsuitable: excessive fines.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; flood hazard.
Tuckerman: Tk	Poor: poorly drained	Poor: excessive fines	Poor: poorly drained	Severe: poorly drained.
Tuscumbia: Tu	Poor: clay texture	Unsuitable: excessive fines.	Poor: high shrink-swell potential.	Severe: high shrink-swell potential; poorly drained; flood hazard.
Waller: Wa, We	Poor: poorly drained	Unsuitable: excessive fines.	Poor: poorly drained	Severe: poorly drained.
Wicksburg: WkC, WkD	Poor: low productivity.	Fair: excessive fines	Fair: fair traffic-supporting capacity.	Moderate: fair traffic-supporting capacity.

engineering properties of the soils—Continued

Degree of limitations and soil features affecting—Con.		Soil features adversely affecting—		
Farm ponds		Agricultural drainage	Irrigation	Small farms and gardens
Reservoir area	Embankments			
Severe: rapid permeability.	Severe: poor resistance to piping and erosion.	Inadequate outlets	Water table	Water table; low productivity.
Moderate: moderately slow permeability.	Moderate: fair stability	All features favorable	All features favorable	Low productivity; water table.
Moderate: moderate permeability.	Moderate: fair stability	All features favorable	All features favorable	All features favorable.
Slight	Moderate: fair stability	Inadequate outlets	Drainage	Water table.
Moderate: moderately slow permeability.	Moderate: fair stability	All features favorable	All features favorable	Water table.
Moderate: moderately slow permeability.	Moderate: fair stability	All features favorable	All features favorable	Low productivity.
Slight	Moderate: high compressibility.	Very slow permeability	Very slow permeability	All features favorable.
Slight	Moderate: high compressibility.	Flood hazard; slow permeability.	Flood hazard; slow permeability.	Flood hazard.
Slight	Moderate: fair stability	Inadequate outlets	Poorly drained	Low productivity; poor drainage.
Slight	Moderate: high compressibility.	Flood hazard; very slow permeability.	Flood hazard; very slow permeability.	Flood hazard.
Slight	Moderate: fair stability	Inadequate outlets; very slow permeability.	Very slow permeability	Water table.
Slight	Moderate: fair stability	All features favorable	All features favorable	All features favorable.

TABLE 6.—*Engineering test data for soil*

[Tests performed by the Texas Highway Department in accordance with standard

Soil name and location	Texas report No.	Depth from surface	Shrinkage	
			Limit	Ratio
		In.	*Pct.*	
Conroe gravelly loamy fine sand: 7.5 miles northeast of Conroe (modal)	65–170–3–1	4–25	16	1. 84
	65–170–3–2	31–47	18	1. 76
	65–170–3–3	47–68	12	1. 89
Segno fine sandy loam: 7 miles southwest of Conroe (modal)	65–170–1–1	21–29	12	1. 93
	65–170–1–2	54–62	13	1. 92
Sorter silt loam: 15 miles southeast of Conroe (modal)	65–170–4–1	3–19	15	1. 87
	65–170–4–2	19–42	14	1. 86
Splendora fine sandy loam: 7.5 miles southwest of Conroe (modal)	65–170–2–1	20–46	13	2. 00
	65–170–2–2	46–56	13	1. 91
16 miles southeast of Conroe (nonmodal—heavy substratum)	65–170–6–1	17–29	15	1. 84
	65–170–6–2	29–40	14	1. 86
Susquehanna fine sandy loam: 2 miles northwest of Conroe (modal)	65–170–5–1	11–26	12	1. 93
	65–170–5–2	26–48	15	1. 81
	65–170–5–3	48–65	17	1. 73
Waller loam: 12 miles southeast of Conroe (modal)	65–170–8–1	14–34	13	1. 89
	65–170–8–2	34–53	10	2. 01

[1] Mechanical analysis according to the AASHO Designation T 88 (*1*). Results by this procedure frequently may differ somewhat from results that would have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

In the Unified system, soils are classified according to particle-size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, ML–CL.

Estimated engineering properties

Table 4 provides estimates of important engineering properties of soils. The estimates are based on field classification and descriptions, physical and chemical tests of selected representative samples, test data from comparable soils in adjacent areas, and on detailed experience in working with the individual kind of soil in the survey area.

Hydrologic groups are soil groupings that have been made without considering slope (gradient length and slope) and vegetative cover as variables. They are as follows:

Group A.—Soils having high infiltration rates even when thoroughly wetted, and consisting chiefly of deep, well drained to excessively drained sands, gravel, or both. These soils have a high rate of water transmission, which indicates low runoff potential.

Group B.—Soils having moderate infiltration rates when thoroughly wetted, consisting chiefly of moderately deep to deep, moderately well drained to well drained soils having moderately fine to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C.—Soils having slow infiltration rates when thoroughly wetted, and consisting chiefly of (1) soils with a layer that impedes the downward movement of water, or (2) soils with moderately fine to fine texture and a slow infiltration rate. These soils have a slow rate of water transmission.

Group D.—Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of (1) clay soils with a high swelling potential; (2) soils with a high permanent water table; (3) soils with claypan or clay layer at or near the surface; and (4) shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission.

samples taken from 7 selected soil profiles

procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis [1]							Liquid limit	Plasticity index	Classification	
Percentage passing sieve—				Percentage smaller than—						
No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)	0.05 mm.	0.005 mm.	0.002 mm.			AASHO [2]	Unified [3]
							Pct.			
71	55	49	16	14	3	2	18	4	A-1-b (0)	SM-SC
83	76	64	42	40	33	32	46	26	A-7-6 (6)	SC
95	92	84	56	55	48	47	50	34	A-7-6 (13)	CL
94	92	89	46	39	21	20	25	15	A-6 (4)	SC
85	81	76	40	31	18	16	27	16	A-6 (2)	SC
100	100	99	70	62	17	10	16	2	A-4 (7)	ML
100	99	99	75	68	27	16	18	4	A-4 (8)	[4] ML-CL
95	94	92	54	48	19	18	24	13	A-6 (5)	CL
95	93	90	54	48	24	17	24	14	A-6 (6)	CL
100	99	98	77	64	20	16	23	8	A-4 (8)	CL
99	98	98	80	68	26	24	31	18	A-6 (11)	CL
100	100	100	62	61	34	33	54	35	A-7-6 (15)	CH
100	100	100	51	49	41	40	44	28	A-7-6 (10)	CL
100	100	100	35	33	30	29	34	19	A-2-6 (2)	SC
100	100	96	68	60	20	11	15	3	A-4 (7)	ML
99	99	97	74	74	40	31	29	19	A-6 (11)	CL

[2] Based on Standard Specifications for Highway Materials and Methods of Sampling and Testing (Pt. 1, Ed. 8): The Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes, AASHO Designation M 145-49 (*1*).

[3] Based on the Unified Soil Classification System (*9*).

[4] SCS and BPR have agreed to consider that all soils having plasticity indexes within two points of the A-line are to be given a borderline classification. An example of borderline classification obtained by this use is ML-CL.

A column indicating the depth to bedrock was not included in table 4, because bedrock is at a great depth beneath all the soils of Montgomery County.

Corrosivity, as used in table 4, indicates the potential danger to uncoated steel or concrete structures through chemical action that dissolves or weakens the structural material. Structural materials may corrode when buried in the soil, and a given material corrodes in some kinds of soil more rapidly than in others. Extensive installations that intersect soil boundaries or soil horizons are more likely to be damaged by corrosion than are installations entirely in one kind of soil or soil horizon.

The water table is the highest point of the soil or underlying rock material that is wholly saturated with water for extended periods.

USDA texture is determined by the relative proportions of sand, silt, and clay in soil material that is less than 2.0 millimeters in diameter. "Sand," "silt," "clay," and other terms used in the USDA textural classification system are defined in the Glossary.

Permeability, as used in table 4, relates only to movement of water downward through undisturbed and uncompacted soil. It does not include lateral seepage. The estimates are based on structure and porosity of the soil. Plowpans, surface crusts, and other properties resulting from use of the soils are not considered.

Available water capacity is that amount of water a soil can hold and make available to plants. It is the numerical difference between the percentage of water at field capacity and the percentage of water at the time plants wilt. The rate is expressed as inches of water per inch of soil depth.

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The pH value and relative terms used to describe soil reaction are explained in the Glossary.

Shrink-swell potential is an indication of the volume change to be expected of the soil material with changes in moisture content. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates hazards

TABLE 7.—*Degree and kind of limitations*

[*Slight* means that soil limitations, if any, are easy to overcome; *moderate*, that it is generally feasible to overcome or

Soil series and map symbols	Sewage disposal: Filter fields	Sewage disposal: Lagoons	Foundation for low buildings
Albany: Ab	Moderate: seasonal water table at depth of 30 to 60 inches.	Moderate: moderate permeability.	Moderate: wetness
Angie: An	Severe: slow permeability	Slight	Moderate: fair bearing capacity; wetness.
Bibb: Bb	Severe: flood hazard	Moderate: moderate permeability.	Severe: flood hazard
Blanton: BlC, BlD	Severe: inadequate filtration	Severe: rapid permeability	Slight
Boy: Bo	Moderate: seasonal water table at depth of 30 to 60 inches.	Severe: rapid permeability in upper part.	Moderate: wetness
Bruno: Br	Severe: flood hazard	Severe: rapid permeability	Severe: flood hazard
Burleson: Bu	Severe: very slow permeability.	Slight	Severe: high shrink-swell potential.
Chipley: Ch	Moderate: seasonal water table at depth of 30 to 60 inches.	Severe: rapid permeability	Moderate: wetness
Conroe: CnC, CoC	Severe: slow permeability	Slight: 0 to 2 percent slopes. Moderate: 2 to 5 percent slopes.	Slight
CoD	Severe: slow permeability	Severe: slopes more than 7 percent.	Moderate: slopes
Crevasse: Cr	Severe: flood hazard	Severe: rapid permeability	Severe: flood hazard
Crowley: Cw	Severe: very slow permeability	Slight	Severe: high shrink-swell potential.
Edna: Ek For Katy part of Ek, see Katy series.	Severe: very slow permeability	Slight	Severe: high shrink-swell potential.
Eustis: Eu	Slight	Severe: rapid permeability	Slight
Ferris: FcC2, FcD2, FgD	Severe: very slow permeability	Moderate: slopes	Severe: high shrink-swell potential; slopes.
Fuquay: Fs, Ft	Moderate: moderate permeability.	Moderate: moderate permeability.	Moderate: fair bearing capacity.
Garner: Ga	Severe: very slow permeability.	Slight	Severe: high shrink-swell potential.
Gunter: Gu	Slight	Severe: rapid permeability in upper part.	Slight
Hockley: Ho	Severe: moderately slow permeability.	Slight	Moderate: fair bearing capacity.
Houston Black: Hs	Severe: very slow permeability.	Slight	Severe: high shrink-swell potential.
Katy: Ka	Severe: very slow permeabiltiy.	Slight	Moderate: fair bearing capacity.
Kaufman: Kc	Severe: flood hazard; very slow permeability.	Slight	Severe: flood hazard; high shrink-swell potential.
Kipling: KlB, KnA, KpB	Severe: very slow permeability.	Slight	Severe: high shrink-swell potential.

affecting use of soils in town and country planning

correct the soil limitations; and *severe*, that use of the soil is questionable because limitations are difficult to overcome]

Cemeteries	Permanent camp and play areas	Picnic areas	Paths and trails
Moderate: wetness	Severe: wetness	Moderate: fine sandy texture; wetness.	Moderate: fine sandy texture; wetness.
Moderate: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness.
Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Slight	Severe: loose sand	Severe: loose sand	Severe: loose sand.
Slight	Severe: wetness	Severe: sandy texture; wetness.	Severe: sandy texture; wetness.
Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Severe: very slow permeability	Severe: clay texture	Severe: clay texture	Severe: clay texture.
Moderate: wetness	Severe: sandy texture	Severe: sandy texture	Severe: sandy texture.
Moderate: slow permeability	Moderate: sandy texture; slow permeability.	Moderate: sandy texture	Moderate: sandy texture.
Moderate: slow permeability	Moderate: sandy texture; slopes; slow permeability.	Moderate: sandy texture; slopes.	Moderate: sandy texture.
Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Severe: wetness; very slow permeability.	Moderate: wetness; very slow permeability.	Moderate: wetness	Moderate: wetness.
Severe: wetness; very slow permeability	Moderate: wetness; very slow permeability.	Moderate: wetness	Moderate: wetness.
Slight	Moderate: sandy texture	Moderate: sandy texture	Moderate: sandy texture.
Severe: very slow permeability	Severe: clay texture; very slow permeability.	Severe: clay texture	Severe: clay texture.
Slight	Moderate: sandy texture	Moderate: sandy texture	Moderate: sandy texture.
Severe: very slow permeability.	Severe: clay texture; very slow permeability.	Severe: clay texture	Severe: clay texture.
Slight	Severe: sandy texture	Severe: sandy texture	Severe: sandy texture.
Moderate: moderately slow permeability.	Moderate: moderately slow permeability.	Slight	Slight.
Severe: very slow permeability.	Severe: clay texture; very slow permeability.	Severe: clay texture	Severe: clay texture.
Severe: very slow permeability.	Severe: very slow permeability.	Moderate: wetness	Moderate: wetness.
Severe: flood hazard	Severe: flood hazard; very slow permeability.	Severe: flood hazard; clay texture.	Severe: flood hazard; clay texture.
Severe: very slow permeability.	Severe: very slow permeability; wetness.	Moderate: clay loam texture; wetness.	Moderate: clay loam texture; wetness.

TABLE 7.—*Degree and kind of limitations affecting use*

Soil series and map symbols	Sewage disposal		Foundation for low buildings
	Filter fields	Lagoons	
Kosse: Ks	Severe: flood hazard	Moderate: moderate permeabiltiy.	Severe: flood hazard
Leefield: Le	Severe: moderately slow permeability.	Slight	Severe: wetness
Lucy: Lu	Slight	Moderate: moderate permeability.	Slight
Oktibbeha: ObC2	Severe: very slow permeability.	Moderate: slopes	Severe: high shrink-swell potential.
Osier: Oc For Chipley part of Oc, see Chipley series.	Severe: water table at depth of 15 to 30 inches.	Severe: rapid permeability	Severe: wetness
Robertsdale: Ro	Severe: seasonal water table at depth of 15 to 30 inches; moderately slow permeability.	Slight	Moderate: wetness
Segno: Se	Severe: moderately slow permeability.	Slight	Moderate: fair bearing capacity.
Sorter: So	Severe: seasonal water table at depth of 15 to 30 inches; slow permeability.	Slight	Severe: wetness
Splendora: Sp	Severe: seasonal water table at depth of 15 to 30 inches; moderately slow permeability.	Slight	Severe: wetness
Sunsweet: Ss	Severe: moderately slow permeability.	Moderate: slopes	Slight
Susquehanna: SuC, SuD	Severe: very slow permeability.	Moderate: slopes less than 7 percent. Severe: slopes greater than 7 percent.	Severe: high shrink-swell potential.
Trinity: Tc, Th	Severe: flood hazard; slow permeability.	Slight	Severe: flood hazard
Tuckerman: Tk	Severe: slow permeability; water table at depth of 0 to 15 inches.	Slight	Severe: poor bearing capacity; wetness; high shrink-swell potential.
Tuscumbia: Tu	Severe: flood hazard; very slow permeability.	Slight	Severe: flood hazard
Waller: Wa, We	Severe: wetness; very slow permeability.	Slight	Severe: drainage; wetness
Wicksburg: WkC, WkD	Severe: slow permeability	Moderate: slopes less than 7 percent. Severe: slopes greater than 7 percent.	Moderate: fair bearing capacity.

of soils in town and country planning—Continued

Cemeteries	Permanent camp and play areas	Picnic areas	Paths and trails
Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Severe: wetness	Moderate: sandy texture; wetness.	Moderate: sandy texture	Moderate: sandy texture.
Slight	Moderate: sandy texture	Moderate: sandy texture	Moderate: sandy texture.
Severe: very slow permeability	Severe: very slow permeability.	Moderate: clay loam texture	Moderate: clay loam texture.
Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Severe: wetness	Severe: wetness	Severe: wetness	Moderate: wetness.
Moderate: moderately slow permeability.	Moderate: moderately slow permeability.	Slight	Slight.
Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Severe: wetness	Severe: wetness	Severe: wetness	Moderate: wetness.
Moderate: moderately slow permeability.	Moderate: moderately slow permeability; sandy clay loam texture.	Moderate: sandy clay loam texture.	Moderate: sandy clay loam texture.
Severe: very slow permeability	Severe: very slow permeability	Moderate: wetness	Moderate: wetness.
Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Severe: flood hazard	Severe: flood hazard	Severe: flood hazard	Severe: flood hazard.
Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness.
Moderate: slow permeability	Moderate: sandy texture	Moderate: sandy texture	Moderate: sandy texture.

to the maintenance of structures constructed in, on, or with such materials.

Engineering interpretations of the soils

Table 5 contains selected information useful to engineers and others who plan to use soil material in construction of highways, water and soil conservation facilities, and buildings. Detrimental or undesirable features are emphasized, but very important desirable features also may be listed. The ratings and other interpretations in this table are based on estimated engineering properties of the soils in table 4; on available test data, including those in table 6; and on field experience. The information applies only to soil depths indicated in table 4. It is reliable to depths of at least 6 feet for most soils.

Topsoil is a term used to designate a fertile soil or soil material, ordinarily rich in organic matter, used as a topdressing for lawns, gardens, roadbanks, and the like. The ratings indicate suitability for such use.

Sand ratings are based on the probability that delineated areas of the soil contain deposits of sand. The ratings do not indicate quality or size of the deposits.

Road fill is material used to build embankments. The ratings indicate performance of soil material moved from borrow areas for this purpose.

In the columns headed "Degree of limitations and soil features affecting," the degree of limitation is indicated by slight, moderate, and severe. Slight means that soil properties generally are favorable for the specified use, or that the limitations are minor and easily overcome. Moderate means that some soil properties are unfavorable but can be overcome or modified by special planning and design. Severe means soil properties are unfavorable and so difficult to correct or overcome that major soil reclamation and special design are required or that use of the soil for the specific purpose is not practical.

Highway location is influenced by features of the undisturbed soil that affect construction and maintenance of highways. Table 5 rates each soil and describes features, favorable as well as unfavorable, that affect geographic location of highways.

Farm pond reservoir areas and embankments are affected by seepage loss of water. The soil features mentioned in the table are those that influence such seepage.

Agricultural drainage installations are influenced by soil permeability, texture, structure, topography and availability of outlets.

Irrigation suitability is determined primarily by the water-holding capacity of a soil, permeability, depth, and slope.

Small farms and gardens thrive where the soil has depth, plant nutrients, good water-holding capacity, and drainage. The degree of acidity or alkalinity suitable for a particular plant is also important. Success in gardening and landscaping depends on recognition of the limitations of the soils for such uses.

Engineering test data

Table 6 contains the results of engineering tests performed by the Texas Highway Department on several important soils in Montgomery County. The table shows the specific location where samples were taken, the depth to which sampling was done, and the results of tests to determine particle-size distribution and other properties significant in soil engineering.

The shrinkage limit is that point of moisture content of a drying soil at which shrinkage stops. As moisture leaves a soil, the soil shrinks. Volume decreases in direct proportion to the loss in moisture, until a condition of equilibrium is reached where shrinkage stops although additional moisture is removed. The shrinkage limit is reported as the moisture content, as a percentage of the ovendry weight of the soil, when shrinkage stops.

Shrinkage ratio is determined by taking the volume change of a soil, that dries from a wet stage to the shrinkage limit, and dividing this by the weight change of the soil during the same drying period. For this calculation, volume and weight changes are expressed as percentages of the volume and weight of the ovendry soil sample.

Mechanical analysis shows the percentages, by weight, of soil particles passing through sieves of specified sizes. Gravel ranges from 3 inches in diameter to just over 2 millimeters, the size of the No. 10 sieve. Sand ranges from 2 millimeters to just over 0.074 millimeter, the size of the No. 200 sieve. ASSHO standards define silt as soil particles between 0.074 millimeter and 0.005 millimeter in size, and clay, as soil particles smaller than 0.005 millimeter. USDA definitions of silt and clay, given in the Glossary, have slightly different boundaries. Clay fraction in these tests was determined by the hydrometer method, rather than the pipette method.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a solid to a plastic state. If the moisture content is further increased, the material changes from plastic to a liquid state. The plastic limit is the moisture content at which the soil material passes from solid to plastic. The liquid limit is the moisture content at which the material changes from plastic to liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

The AASHO and Unified classifications have been explained earlier in the engineering section.

Use of soils in town and country planning

Table 7 gives soil ratings and adverse features affecting the use of soil material in construction of sewage disposal systems, foundations for buildings, cemetery locations, and recreation developments. Ratings and other interpretations are based on estimated engineering properties of the soils, on available test data, and on field experience. In table 7, degree of limitation is given as a rating (slight, moderate, or severe). If the limitation is moderate or severe, the principal reasons for the rating are shown in the table. For a rating of slight, no limitation is shown. Following are those limitations that most affect ratings for the various uses shown in table 7.

Filter fields for septic tanks are affected by permeability, location of water table, and susceptibility to flooding.

Sewage lagoons are influenced by permeability, location of water table, and slope.

Foundations for low buildings are affected by features of the undisturbed soil that influence its capacity to support low buildings that have normal foundation loads. Specific values of bearing strength are not assigned.

Cemeteries are influenced by permeability, location of water table, and the flood hazard.

Recreation areas, including *permanent camp and play areas*, *picnic areas*, and *paths and trails*, are affected by wetness, soil texture, flood hazard, trafficability, and permeability.

Geology [5]

On the basis of the soil patterns shown on the General Soil Map, some generalization can be made about the soils and their relationships to the parent materials, or geologic units, in the county.

For this discussion, the geologic formations in Montgomery County can be divided into four groups according to age: (1) Recent, (2) Late Pleistocene or Early Recent, (3) Pleistocene, and (4) Tertiary. The relation of geologic units to soil associations is given in table 8.

Recent

Recent alluvium, the parent material of the Tuscumbia association, is less than 12,000 years old. It is almost all river deposit in origin. The sandy and silty soils developed on abandoned channels, point bars, and natural levees. Deposits were built up as the streams meandered or moved laterally. Streambanks built up on the inside curve, or meander, as material was eroded from the outside curve.

Surfaces of point-bar deposits are marked by a series of parallel curved ridges separated by swales or meander scrolls.

Natural levee deposits flank stream channels. They were build up during floods at places where stream velocity dropped as the water overflowed the channel banks. Small patches of sandy soils or sand splays were laid down where floodwaters broke through natural levees. Some of the sand splays, and some parts of point bars, have been modified by features resembling stabilized sand dunes, suggesting wind action sometime in the past 12,000 years.

Clayey soils formed in the fine-grained sediments laid down by floodwaters between the natural levees and the walls of the Recent flood plain, on channel fills, and in the swales of meander scrolls.

TABLE 8.—*Geology of Montgomery County soil associations*

Age	Formation	Soil associations
Recent	(1)	Tuscumbia.
Late Pleistocene or Early Recent.	Deweyville deposits.	Albany-Tuckerman.
Pleistocene	Beaumont Clay	Parts of Sorter and Splendora-Boy-Segno.
	Montgomery [2]	Parts of Sorter and Splendora-Boy-Segno.
	Bentley [2]	Parts of Sorter and Splendora-Boy-Segno.
	Willis	Conroe, Hockley-Katy, Wicksburg-Susquehanna, and parts of Splendora-Boy-Segno.
Tertiary (Miocene)	Fleming	Ferris-Houston Black-Kipling.

[1] Recent alluvium.
[2] Lissie Formation.

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Late Pleistocene or Early Recent

Soils of the Albany-Tuckerman association developed on the late Pleistocene (or the Early Recent of some geologists) Deweyville deposits of East Texas (*3*). The surface of the deposits is the first high terrace above the Recent flood plains of the San Jacinto, Trinity, Neches, and Sabine Rivers in East Texas. The surface of the deposits in Montgomery County is marked by meander scars and old meander patterns that are considerably larger than those of the present river flood plain. Radiocarbon tests of fossil wood samples from the Deweyville indicate they are from 13,000 to 25,000 years old.

Parent material of the Albany-Tuckerman association is coarser (contains more sand and gravel) but is of origin similar to that of the younger Tuscumbia association. The material is coarser because the late Pleistocene streams flowed at higher velocities than those laying down the Deweyville deposits. This is indicated by the larger Pleistocene stream meanders. In places, the surface sands have been reworked by the wind and a few, ill-defined, stabilized dunes have been formed.

Pleistocene

The Pleistocene, or "ice age," formations in Montgomery County were all derived from river deposits. In addition to the areas of sediment left during the late Pleistocene period discussed under the previous heading, delta forms, such as coastal marshes and mudflats, were formed from river deposits during the ice age.

Sediment of the Pleistocene formations is related to the rise and fall of sea level during the major advances and retreats of the continental ice sheets, over the past one million years. When glaciers were growing, sea level all over the world fell. The drop, caused by water being transformed into glacial ice, was as much as 450 feet below present sea level. All major streams in the Gulf Coast deepened their channels, flowed across the continental shelf, and emptied into the Gulf many tens of miles beyond the present shoreline.

When the glaciers melted, sea level rose, and the deepened valleys were backfilled with alluvium. Along the edge of the Gulf, overlapping meander belts terminating in deltas emerged from the valleys into the continental shelf. These deposits and the upstream valley fills make up the Pleistocene formations.

Each Pleistocene formation was tilted Gulfward after being deposited. Each partly buried the Gulfward edge of the previous formation. The boundary line between an older formation and the one following is marked by sharp steep slopes in some places. In other places, definite boundaries are obscure or absent, especially where stream or wave erosion was slight.

Exposed surfaces of original Pleistocene deposits make up a series of terraces paralleling the present Gulf of Mexico. Slopes of the tilted formations range from about 1 or 2 feet per mile, for Beaumont Clay, to 10 feet per mile for the Willis Formation. Successively older formations, in addition to being tilted, have been subjected to greater and greater stream cutting.

Beaumont Clay.—The outcrop area of Beaumont Clay in Montgomery County is small. It is principally exposed in the extreme southeastern part of the county. The exposed Beaumont Formation extends southwesterly, from the area where Caney and Peach Creeks meet to the area flanking U.S. Highway 59 south of Porter. The outcrop terminates against the small area of Albany-Tuckerman association northeast of the West Fork of the San Jacinto River. This patch of Beaumont Clay underlies a broad terrace remnant of the valley fill of the Pleistocene San Jacinto River. No particular soil associations are restricted to the Beaumont Clay. It falls within parts of the Sorter and Splendora-Boy-Segno associations. The principal basis for separating the Beaumont terrace here from the older Montgomery terrace is a topographic "break," an indistinct slope, or scarp, which can be seen along U.S. Highway 59 just south of Porter. Based on radiocarbon dating, the Beaumont Clay is more than 40,000 years old.

Montgomery and Bentley, Lissie Formation.—In the older literature (for example: Plummer, 1932, p. 781) (*7*), the Lissie Formation and the Beaumont Clay comprised the Houston Group, essentially the Pleistocene of the Gulf Coast region. Beginning with H. A. Bernard's mapping of the Pleistocene and Recent deposits between the Sabine and Neches Rivers in southeast Texas, in the late 1940's (*3*), many geologists have accepted the Louisiana four-fold division of the Pleistocene (see table 8). The Lissie of Plummer and other earlier geologists has been subdivided into a younger Montgomery Formation and an older Bentley Formation. In many areas, including Montgomery County, rock and soil content is similar, and separation has been on the basis of regional boundary slopes. If these new subdivisions are ignored, Lissie underlies virtually all of the Sorter association (except for that part included in the Beaumont Clay) and most of the Splendora-Boy-Segno association east of the Conroe oilfield. Another part of the Lissie is located under that part of the Splendora-Boy-Segno association due south of (but not including) the W. Goodrich Jones State Forest and west of Interstate 45.

Willis Formation.—The oldest Pleistocene Formation in the county is the Willis Formation, which was named from exposures near Willis, in Montgomery County (*4, 5*). This is parent material of soils in the Conroe, the Wicksburg-Susquehanna, and the Hockley-Katy associations, and parts of the Splendora-Boy-Segno association.

The boundary between the Willis and the Montgomery and Bentley terraces is the Hockley Scarp, a prominent topographic feature best known where U.S. Highway 290 crosses it in Harris County several miles southeast of Hockley. In Montgomery County it is located within the W. Goodrich Jones State Forest. From here it runs northeasterly and is interrupted by an extensive tract of Deweyville deposits (Albany-Tuckerman association) along the West Fork of the San Jacinto River. On the other side of the river, it resumes its northeasterly trend and passes north of the Conroe oilfield.

The Willis Formation is the coarsest of the Pleistocene Formations. It consists largely of clayey sand and gravel and some local clay beds. It is noncalcareous, is cemented with iron oxides, and contains numerous iron oxide concretions. The gravel is fairly coarse, is uniformly sandy, and contains much fossilized or petrified wood.

The Willis Formation formerly covered a considerable part of the Ferris-Houston Black-Kipling association, judging from the many isolated hills and ridges now covered with thin remnants of Willis material.

Tertiary

The only Tertiary or Cenozoic unit in Montgomery County, the Fleming Formation, immediately underlies and is the parent material for the Ferris-Houston Black-Kipling association. In the older geologic literature (for example, Plummer) (*7*), the Fleming Group included the Oakville Formation (older) and the Lagarto Formation (younger). What is here called the Fleming Formation is roughly equivalent to the Lagarto. The Oakville is now considered to be connected with the lower part of the Fleming.

The Fleming Formation is a calcareous clay that has local beds or ledges of calcareous sandstone. In surface exposures, the clay is mostly light gray to yellowish gray, and in some places contains calcium carbonate concretions.

The Fleming Formation is Miocene in age and is over 11 million years old.

Formation and Classification of the Soils

This section contains two main parts. First, the five major factors of soil formation and the process involved in soil horizon differentiation are discussed briefly in terms of their effect on the soils in Montgomery County. Second, the system of classifying soils is discussed, and the soils of Montgomery County are placed in the system.

Factors of Soil Formation

Soil is the product of the interaction of the five major factors of soil formation. These factors are climate, living organisms (especially vegetation), parent material, topography, and time. If a factor, such as climate or vegetation, is varied, a different soil is formed.

Climate

The climate of Montgomery County is humid and is presumed to be similar to the climate existing when the soils were formed. The humid climate has promoted moderately rapid soil development. Climate is uniform throughout the county, although its effect is modified locally by runoff. In Montgomery County, the differences among soils are not believed to result from climate.

Living organisms

Plants, insects, animals, bacteria, and fungi are important in the formation of soils. Gains in organic matter and nitrogen in the soil, gains or losses in plant nutrients, and changes in soil structure and porosity are some of the changes caused by living organisms.

Vegetation, dominantly timber, has affected soil formation in Montgomery County more than other living organisms. Timber vegetation produced soils that generally are low in organic matter. Some of the upland prairie soils that have had a grass vegetation are medium in organic matter.

Parent material

Parent material is the unconsolidated mass from which a soil is formed. It determines the limits of the chemical and mineralogical composition of the soil. In Montgomery County the parent material of most soils is sedimentary and consists of material that has been deposited by water. The parent material of most soils is terrace or beach deposits of noncalcareous unconsolidated material ranging from sand to clay. Some soils developed from calcareous clayey sediments.

The Chipley, Crevasse, and Osier series formed in thick beds of sand. These soils consist of highly resistant quartz sand and do not have clay-enriched horizons. Segno and Splendora soils developed in loamy deposits. This permitted moderate water movement, and these soils have clay-enriched horizons that contain concentrations of iron. Ferris and Houston Black soils developed in calcareous clayey deposits. The clayey material retarded the movement of water and air, and the result is calcareous soils lacking clay-enriched horizons. The geology of the parent materials is discussed in more detail in the "Geology" section.

Topography

Topography, or relief, affects soil formation through its influence on drainage, erosion, plant cover, and soil temperature. Topography of Montgomery County ranges from a flat featureless plain that has little stream dissection, located in the southeast part of the county, to broad interstream divides that have rolling side slopes and numerous small intermittent drains, located in the northwest part of the county.

Soils that formed in the nearly level areas, such as the Splendora and Sorter, have little horizonation. Thick sandy soils that have a more distinct horizonation, such as the Boy and Fuquay, are on the slightly convex ridges. Soils that have distinct horizonation throughout, such as the Susquehanna and Wicksburg, occur on the broad interstream divides. Wicksburg soils on rolling side slopes also have distinct horizons.

Time

Time, usually a long time, is required for formation of soils with distinct horizons. The differences in length of time that parent material has been in place are generally reflected in the degree of development of the soil profile. The soils in Montgomery County range from young to old. The young soils have little horizon development, and the old soils have well-expressed soil horizons. Crevasse soils are an example of young soils that have little horizon development. Except for slight accumulation of organic matter and darkening of their surface layer, Crevasse soils retain most of the characteristics of their fine sand parent material. Susquehanna soils are an example of older soils that have well-developed soil horizons. They have developed distinct A and Bt horizons that bear little resemblance to the original parent material.

Processes of Soil Horizon Differentiation

Several processes were involved in the formation of horizons in the soils of Montgomery County. The three main processes are: (1) accumulation of organic matter, (2) leaching of calcium carbonates and bases, and (3) formation and translocation of silicate clay minerals. In most soils, more than one of these processes have been active in the development of horizons.

Accumulation of organic matter in the upper part to form an A1 horizon has been important. The soils in Montgomery County range from low to medium in organic matter.

Soil scientists are generally agreed that leaching of bases in soils usually precedes translocation of silicate clay minerals. Calcium carbonate has been leached from the upper horizons of all the soils of the county except those of the Blackland Prairie. This contributes to the development of distinct horizons.

In many soils of Montgomery County, the downward translocation of clay minerals has also contributed to horizon development. Fuquay, Segno, Susquehanna, and Wicksburg are examples of soils in which translocated silicate clays have accumulated in the Bt horizons. The Bt horizons contain appreciably more silicate clay than the A horizons of these soils. Carbonate and soluble salts were probably leached to a considerable extent before the translocation of silicate clays took place.

Classification of Soils

Soils are classified so that we can more easily remember their significant characteristics, assemble knowledge about them, see their relationship to one another and to the whole environment, and develop principles that help us understand their behavior and response to manipulation. First through classification, and then through use of soil maps, we can apply our knowledge of soils to specific fields and other tracts of land.

The current system of classification defines classes in terms of observable or measurable properties of soils. The properties chosen are primarily those that permit grouping of soils that are similar in genesis. Genesis, or mode of soil origin, does not appear in the definitions of the classes; it lies behind the classes. The classification is designed to accommodate all soils. It employs a nomenclature that is both connotative and distinctive.

The system of soil classification discussed in this subsection was adopted as standard for all soil surveys in the United States, effective January 1, 1965. It replaces the classification of Baldwin, Kellogg and Thorp (*2*) as revised by Thorp and Smith (*8*). The classification has six categories. Beginning with the most inclusive, the categories are the order, suborder, great group, subgroup, family, and series.

The order, subgroup, and family classifications of the soil series in Montgomery County are shown in table 9. Some of the subgroups are tentative pending modification of the classification system.

TABLE 9.—*Classification of soil series*

Series	Family	Subgroup	Order
Albany	Loamy, siliceous, thermic	Grossarenic Paleudults	Ultisols.
Angie	Clayey, mixed, thermic	Aquic Paleudults	Ultisols.
Bibb	Coarse-loamy, siliceous, acid, thermic	Typic Haplaquents	Entisols.
Blanton [1]	Loamy, siliceous, thermic	Grossarenic Paleudults	Ultisols.
Boy	Loamy, siliceous, thermic	Grossarenic Plinthic Paleudalfs	Alfisols.
Bruno	Sandy, mixed, thermic	Typic Udifluvents	Entisols.
Burleson	Fine, montmorillonitic, thermic	Udic Pellusterts	Vertisols.
Chipley	Siliceous, thermic, coated	Aquic Quartzipsamments	Entisols.
Conroe	Clayey, kaolinitic, thermic	Arenic Plinthic Paleudults	Ultisols.
Crevasse	Mixed, thermic	Typic Udipsamments	Entisols.
Crowley	Fine, montmorillonitic, thermic	Typic Albaqualfs	Alfisols.
Edna	Fine, montmorillonitic, thermic	Vertic Albaqualfs	Alfisols.
Eustis	Sandy, siliceous, thermic	Psammentic Paleudults	Ultisols.
Ferris	Fine, montmorillonitic, thermic	Udorthentic Chromusterts	Vertisols.
Fuquay	Loamy, siliceous, thermic	Arenic Plinthic Paleudults	Ultisols.
Garner	Fine, montmorillonitic, thermic	Entic Pelluderts	Vertisols.
Gunter	Loamy, siliceous, thermic	Grossarenic Plinthic Paleudults	Ultisols.
Hockley	Fine-loamy, siliceous, thermic	Plinthic Paleudalfs	Alfisols.
Houston Black	Fine, montmorillonitic, thermic	Udic Pellusterts	Vertisols.
Katy	Fine, kaolinitic, thermic	Albaquic Paleudalfs	Alfisols.
Kaufman	Fine, montmorillonitic, noncalcareous, thermic	Vertic Haplaquolls	Mollisols.
Kipling	Fine, montmorillonitic, thermic	Vertic Hapludalfs	Alfisols.
Kosse	Fine-loamy, mixed, noncalcareous, thermic	Fluventic Haplaquolls	Mollisols.
Leefield	Loamy, siliceous, thermic	Arenic Plinthaquic Paleudults	Ultisols.
Lucy	Loamy, siliceous, thermic	Arenic Paleudults	Ultisols.
Oktibbeha	Very fine, montmorillonitic, thermic	Vertic Hapludalfs	Alfisols.
Osier	Siliceous, thermic	Typic Psammaquents	Entisols.
Robertsdale	Fine-loamy, siliceous, thermic	Plinthaquic Fragiudults	Ultisols.
Segno	Fine-loamy, siliceous, thermic	Plinthic Paleudalfs	Alfisols.
Sorter	Coarse-loamy, siliceous, thermic	Typic Ochraqualfs	Alfisols.
Splendora	Fine-loamy, siliceous, thermic	Glossaquic Fragiudalfs	Alfisols.
Sunsweet	Clayey, kaolinitic, thermic	Plinthic Paleudults	Ultisols.
Susquehanna [2]	Fine, montmorillonitic, thermic	Vertic Paleudalfs	Alfisols.
Trinity	Fine, montmorillonitic, calcareous, thermic	Vertic Haplaquolls	Mollisols.
Tuckerman	Fine-loamy, mixed, thermic	Typic Ochraqualfs	Alfisols.
Tuscumbia	Fine, mixed, nonacid, thermic	Vertic Haplaquepts	Inceptisols.
Waller	Fine-loamy, mixed, thermic	Typic Glossaqualfs	Alfisols.
Wicksburg	Clayey, kaolinitic, thermic	Arenic Paleudults	Ultisols.

[1] Soils correlated as Blanton are taxadjuncts to the Blanton series. These soils lack a continuous Bt horizon within 80 inches of the surface. They are enough like Blanton soils in morphology, composition, and behavior that a new series is not warranted.

[2] These soils are taxadjuncts to the Susquehanna series because they have a more than 20 percent decrease in clay content within 60 inches of the surface. They are enough like Susquehanna soils in morphology, composition, and behavior that a new series is not warranted.

General Nature of the County

This section provides information of general interest about Montgomery County. It discusses briefly the history of the county, industry, transportation, natural resources, and climate.

Montgomery County was created by an act of the Texas Legislature in 1837. It was named for Richard Montgomery, an American Revolutionary War general. One of the earliest settlements was Montgomery, site of the first county seat. On July 4th, 1837, the townsite of Montgomery was advertised for sale in the Houston Telegraph and Texas Register (6).

The county showed a rather slow growth until recent years. Starting about 1950, the county has had a tremendous growth in population and industry.[6] The population of the county is 31,800 (1965 estimate). Conroe, the present county seat, has a population of 12,550 (1965 estimate). Other towns and communities in the county include Dobbin, Decker Prairie, Groceville, Magnolia, Montgomery, New Caney, Oklahoma, Porter, Splendora, and Willis.

Industry

During the last 20 years many industrial plants have been established in Montgomery County. Industries operating in the county include wood treating plants, wood handling plants, paint companies, steel fabricating plants, petroleum and chemical refining plants, an air-conditioning filter plant, and a livestock auction.

Transportation

Interstate 45 is the principal north-south highway. It connects Houston and Dallas and bisects the county verti-

[6] In 1965 Montgomery County was made a part of the Houston five county Standard Metropolitan Statistical Area. It has been increasingly used for bedroom communities by people working in Houston. A number of housing developments have been built in recent years. An even greater number are under construction or planned. A 21,000 surface acre combination reservoir and recreational lake is under construction on the West Fork of the San Jacinto River in Montgomery County. It is being built jointly by the City of Houston and the San Jacinto River Authority.

cally. U.S. Highway 59, which connects Houston and Nacogdoches and points to the northeast, goes through the eastern side of the county. Texas Highway 105 is the principal east-west highway. It connects Beaumont and Navasota and bisects the county horizontally. Numerous farm to market roads connect all of the towns and communities of the county. Most county roads are paved with asphalt.

There are five railroads in the county. The Missouri Pacific; Fort Worth and Denver; and Chicago, Rock Island and Pacific are the north-south railroads. The Southern Pacific Railroad goes through the east side of the county to the northeast. The Atchison, Topeka, and Santa Fe Railway Company lines go through the center of the county from east to west.

Natural Resources

Soil is the most important natural resource in Montgomery County. The soils are, in general, excellent for the production of pine timber, the principal agricultural crop of the county. Timbered areas are also used for woodland grazing of cattle. A very small percentage of the acreage in the county is used for cotton, corn, forage crops, and truck crops.

Oil is the most important mineral in the county. The first producing oil well was drilled in 1931. Sand and gravel for construction are obtained in parts of the county.

Climate [7]

The climate of Montgomery County is dominated by the Gulf of Mexico. The county lies within the humid, subtropical belt that extends northward from the Gulf during spring, summer, and fall. Frequently in winter, cooler continental air from the north interacts with the moist tropical air from the Gulf over this region. As a result, rainfall in Montgomery County is abundant and fairly evenly distributed throughout the year. Heaviest short-period rainfall is associated with large, slow moving thunderstorms, and with dying tropical disturbances that sometimes enter the Texas coast and move northward through east Texas early in fall.

Winters are mild; summers are hot and humid. The average daily maximum temperature is 63° F. in winter and 94° in summer. See table 10.

Snowfalls are rare in Montgomery County, and one may experience several winters in succession with no measurable amounts.

On rare occasions, heavy snows may occur, such as the 6.5 inches that fell in January 1940. These distort the average monthly snowfall data and leave the impression that more snow falls each season than is actually the case.

Average annual relative humidity is about 73 percent, and there is little variation from month to month. The prevailing wind is southeasterly. The county receives about 65 percent of the total possible sunshine annually. The cloudiest months are December, January, and February, which have about 50 percent of the possible sunshine.

Severe wind and hailstorms are rare, and only one tornado is known to have occurred within Montgomery County in the 69-year period 1896–1964.

March 1 is the average date of the last temperature of 32° or lower in spring, and November 26 is the average date of the first freeze in fall. The average length of the warm season is 270 days.

The sun shines an average of 65 percent of the possible hours. The relative humidity is between 80 and 85 percent at 6 a.m., between 55 and 60 percent at noon, between 60 and 65 percent at 6 p.m., and between 75 and 85 percent at midnight.

The average annual rate of evaporation from a 4-foot, class A pan is between 70 and 75 inches, and the average annual rate of lake evaporation is between 52 and 54 inches.

[7] Prepared by ROBERT B. ORTON, Texas State Climatologist, U.S. Weather Bureau.

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Glossary

Alkali soil. Generally, a highly alkaline soil. Specifically, an alkali soil has so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that the growth of most crop plants is low from this cause.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity. The amount of water a soil can hold and make available to plants. It is the numerical difference between the percentage of water at field capacity and the percentage of water at the time plants wilt, expressed as inches of water per inch of soil depth.

Calcareous soil. A soil containing enough calcium carbonate (often with magnesium carbonate) to effervesce (fizz) visibly when treated with cold, dilute hydrochloric acid.

TABLE 10.—*Temperature*

[From records kept at the Weather

Month	Temperature						Average number of days with[2]—			
	Average daily maximum	Average daily minimum	Record high[1]	Year of occurrence	Record low[1]	Year of occurrence	Maximum temperature of—		Minimum temperature of—	
							90° F. or above	32° F. or below	32° F. or below	0° F. or below
	° F.	° F.	° F.		° F.					
January	61.2	38.3	84	1943	7	1940	0	1	10	0
February	65.3	42.1	90	1940	6	1951	0	0	4	0
March	72.1	47.7	96	1946	18	1943	0	0	2	0
April	78.8	56.6	98	1935	29	1940	1	0	0	0
May	85.2	63.9	96	[4] 1958	42	1945	10	0	0	0
June	91.7	69.5	104	[4] 1948	54	1946	24	0	0	0
July	94.2	71.5	106	1934	61	1939	29	0	0	0
August	94.8	71.2	107	[4] 1962	56	1940	28	0	0	0
September	89.5	66.6	104	1951	43	1942	19	0	0	0
October	82.9	56.7	99	1938	30	1943	6	0	0	0
November	70.5	45.2	94	1938	21	1938	0	0	2	0
December	63.6	40.3	89	1955	12	1950	0	0	8	0
Year	79.2	55.8	107	[4] 1962	6	1951	117	1	26	0

[1] Period of record: 1934–63.
[2] Based on 10-year average: 1954–63.
[3] Monthly heating degree day totals are the sums of the negative departures of average daily temperatures from 65°F.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of clay on the surface of a soil aggregate. Synonyms: clay coat, clay skin.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrations of compounds, or of soil grains cemented together. The composition of some concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are examples of material commonly found in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Erosion. The wearing away of the land surface by wind (sandblast), running water, and other geological agents.

Flood plain. Nearly level land, consisting of stream sediment, that borders a stream and is subject to flooding unless protected artificially.

Gilgai. Typically, the microrelief of Vertisols—clayey soils that have a high coefficient of expansion and contraction with changes in moisture; usually a succession of microbasins and microknolls, in nearly level areas, or of microvalleys and microridges that run with the slope.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Gravel. Coarse rounded or angular fragments, not prominently flattened, that range in size from 2 millimeters to 3 inches in diameter.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O horizon.—The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon.—The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, and sesquioxides (iron and aluminum oxides).

B horizon.—The mineral horizon below the A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused: (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

Intermittent drain (or stream). A stream or part of a stream that flows only in direct response to precipitation. It receives *and precipitation data*

Bureau Station at Conroe]

Average heating degree days [3]	Precipitation												
	Average total	Greatest daily	Year of occurrence	Driest year [1] (1951)	Wettest year [1] (1960)	1 year in 10 will have— Less than—	1 year in 10 will have— More than—	Average number of days with precipitation of [2]— 0.10 inch or more	0.50 inch or more	1.00 inch or more	Snow and sleet Average monthly	Greatest monthly	Year of occurrence
	In.	*In.*		*In.*	*In.*	*In.*	*In.*				*In.*	*In.*	
522	4.04	4.20	1945	2.84	4.42	1.28	6.97	6	3	1	0.3	6.5	1940
326	3.62	3.15	1961	2.83	4.86	1.45	5.53	6	3	1	.2	4.5	1940
211	2.48	4.09	1949	3.85	.74	.59	6.09	3	1	(5)	0	0	
52	4.72	6.02	1945	.84	5.57	.84	8.59	5	3	2	0	0	
2	4.96	6.34	1935	1.79	.48	1.05	8.16	4	2	1	0	0	
0	3.97	5.91	1960	2.70	11.88	.84	7.49	5	3	2	0	0	
0	4.00	5.30	1943	1.67	7.73	1.13	7.73	5	2	1	0	0	
0	3.36	5.61	1945	.82	8.90	1.05	5.83	6	3	1	0	0	
0	3.77	9.87	1961	4.65	1.16	1.16	7.23	5	2	1	0	0	
38	3.19	5.44	1949	.81	9.94	.05	9.94	4	2	1	0	0	
236	4.79	7.06	1940	1.77	6.88	1.71	8.44	6	3	1	0	0	
427	4.54	6.36	1935	2.38	6.50	1.96	6.50	6	3	1	(5)	.5	1945
1814	47.44	9.87	1961	26.95	69.06	33.18	64.49	61	30	13	.5	6.5	1940

[4] Also on earlier months or years.
[5] Less than one-half.

little or no water from springs and no long-continued supply from melting snow or other sources.

Leaching. Removal of dissolved materials from a soil by percolating water.

Loam. Soil material that contains 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

Mottled. Irregularly marked with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Natural soil drainage. Refers to the conditions of frequency and duration of periods of saturation or partial saturation that existed during the development of the soil, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven different classes of natural soil drainage are recognized.

Excessively drained soils are commonly very porous and rapidly permeable and have a low water-holding capacity.

Somewhat excessively drained soils are also very permeable and are free from mottling throughout their profile.

Well-drained soils are nearly free from mottling and are commonly of intermediate texture.

Moderately well drained soils commonly have a slowly permeable layer in or immediately beneath the solum. They have uniform color in the A and upper B horizons and have mottling in the lower B and the C horizons.

Somewhat poorly drained soils are wet for significant periods but not all the time, and in Podzolic soils commonly have mottlings below 6 to 16 inches, in the lower A horizon and in the B and C horizons.

Poorly drained soils are wet for long periods and are light gray and generally mottled from the surface downward, although mottling may be absent or nearly so in some soils.

Very poorly drained soils are wet nearly all the time. They have a dark-gray or black surface layer and are gray or light gray, with or without mottling, in the deeper parts of the profile.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Pedon. The smallest volume that can be called "a soil."

Permeability. The quality of a soil horizon that enables water or air to move through it. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

Phase, soil. A subdivision of a soil, series, or other unit in the soil classification system made because of differences in the soil that affect its management but do not affect its classification in the natural landscape. A soil series may be divided into phases, for example, because of differences in slope, stoniness, thickness, or some other characteristic that affects its management but not its behavior in the natural landscape.

pH value. A numerical means for designating relatively weak acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other dilutants that commonly shows as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to hardpan or to irregular aggregates on repeated wetting and drying, or it is the hardened relicts of the soft, red mottles. It is a form of the material that has been called laterite.

Plow layer. The part of the soil ordinarily moved in tillage.

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is precisely neutral in reaction, because it is neither acid nor alkaline. An acid, or "sour," soil is one that gives an acid reaction; an alkaline soil is one that is alkaline in reaction. In words, the degrees of acidity or alkalinity are expressed thus:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock. Only the upper part of this, modified by organisms and other soil-building forces, is regarded by soil scientists as soil. Most American engineers speak of the whole regolith, even to great depths, as "soil."

Runoff. The water that runs off the surface without sinking into the soil.

Sand. Individual rock or mineral fragments in soils having diameters ranging from 0.05 to 2.0 millimeters. Most sand grains consist of quartz, but they may be any mineral composition. The textural class name of any soil that contains 85 percent or more sand and not more than 10 percent clay.

Series, soil. A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

Silt. Individual mineral particles in a soil that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). Soil of the silt textural class is 80 percent or more silt and less than 12 percent clay.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on relatively steep slopes and in swelling clays, where there is marked change in moisture content.

Soil. A natural, three-dimensional body on the earth's surface that supports plants and that has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. Technically, the part of the soil below the solum.

Surface layer. The layer of soil material nearest the surface. A surface layer may be of any thickness.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that it may soak into the soil or flow slowly to a prepared outlet without harm. Terraces in fields are generally built so they can be farmed. Terraces intended mainly for drainage have a deep channel that is maintained in permanent sod.

Terrace (geological). An old alluvial plain, ordinarily flat or undulating, bordering a river, lake, or the sea. Stream terraces are frequently called second bottoms, as contrasted to flood plains, and are seldom subject to overflow. Marine terraces were deposited by the sea and are generally wide.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Tilth, soil. The condition of the soil in relation to the growth of plants, especially soil structure. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.